PERIODICAL

#37

FAO Fisheries Biology Technical Paper No. 37

FB/T37
CB - Bibliography

THE PITUITARY GLAND AND ITS RELATION TO THE REPRODUCTION OF FISHES IN NATURE AND IN CAPTIVITY

An annotated bibliography for the years 1956-1963

LA GLANDE PITUITAIRE ET SES RAPPORTS AVEC LA REPRODUCTION DES POISSONS DANS LA NATURE ET EN CAPTIVITÉ

Bibliographie annotée pour les années 1956-1963

LA GLANDULA PITUITARIA Y SU RELACION CON LA REPRODUCCION DE PECES EN ESTADO NATURAL O EN CAUTIVIDAD

Bibliografía anotada de los años 1956-1963

SEP 21 1964
FISH & WILDLIFE SERVICE

compiled by — compilée par — recopilada por

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ORGANISATION DES NATIONS UNIES POUR L'ALIMENTATION ET L'AGRICULTURE
ORGANIZACION DE LAS NACIONES UNIDAS PARA LA AGRICULTURA Y LA ALIMENTACION
Rome, 1964

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Special groups of synopses are identified by symbols followed by classification numbers based on indexed code of " Current Bibliography ":

SAST	Data concerning certain species and fish stocks.
MAST	Information on methods and subjects.
OT	Oceanographic data.
IT	Limnological data.
CART	Information concerning fisheries and resources of certain countries and regions (FID/S).

Des catégories spéciales d'études synoptiques sont identifiées à l'aide de symboles suivis des chiffres de classification basés sur le code d'indexation de la « Current Bibliography »:

SAST	Données sur certaines espèces et populations de poissons.
MAST	Renseignements sur des méthodes et des sujets.
OT	Données océanographiques.
IT	Données limnologiques.
CART	Renseignements sur les pêcheries et les ressources de certains pays et régions (FID/S).

Grupos especiales de sinopsis se distinguen con las siglas siguientes, seguidas por números de clasificación que se basan en las claves de los indices de la « Current Bibliography »:

SAST	Datos relativos a ciertas especies y poblaciones.
MAST	Sinopsis sobre métodos y materias.
OT	Sinopsis sobre oceanografía.
IT	Sinopsis sobre limnologia.
CART	Información sobre los recursos acuáticos vivos de algunos países y regiones (FID/S).

FAO Fisheries Biology Technical Paper FB/T (No.)

Special groups of Technical Papers are identified by:

RE	Indexed lists of experts and institutions drawn from Registers maintained by Biology Branch.
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MFS	Provisional editions of " FAO Manuals in Fisheries Science."

Some documents also have another identification, if, for example, they have been contributed to a meeting for which papers have been numbered according to another system.

Des catégories spéciales de documents techniques sont identifiées à l'aide des symboles suivants:

RE	Listes indexées d'experts et institutions tirées des registres tenus à jour par la Sous-division de la biologie.
CB	Listes de périodiques, des sections spéciales de la « Current Bibliography for Aquatic Sciences and Fisheries », des bibliographies particulières et des articles sur les problèmes de documentation.
MFS	Editions provisoires des « Manuels FAO de la science des pêches ».

Certains documents portent parfois d'autres numéros d'identification, par exemple s'ils ont été préparés pour une réunion dont les documents ont été numérotés selon un autre système.

Grupos especiales de documentos técnicos se identifican por las siglas siguientes:

RE	Listas índices de expertos y de instituciones tomadas de los registros que se llevan en la Subdirección de Biología.
CB	Listas de periódicos, secciones especiales de la « Current Bibliography for Aquatic Sciences and Fisheries », bibliografías especiales y trabajos relativos a los problemas de documentación.
MFS	Ediciones provisionales de los « Manuales FAO de la Ciencia de la Pesca ».

Algunos documentos tienen también otra identificación si, por ejemplo, son contribuciones a una reunión cuyos documentos han sido marcados con arreglo a otros sistemas.

THE PITUITARY GLAND AND ITS RELATION TO THE REPRODUCTION OF FISHES IN NATURE AND IN CAPTIVITY

AN ANNOTATED BIBLIOGRAPHY FOR THE YEARS 1956-1963

LA GLANDE PITUITAIRE ET SES RAPPORTS AVEC LA REPRODUCTION DES POISSONS DANS LA NATURE ET EN CAPTIVITE

BIBLIOGRAPHIE ANNOTEE POUR LES ANNEES 1956-1963

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BIBLIOGRAFIA ANOTADA DE LOS AÑOS 1956-1963

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Rome, April 1964

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Preparation of this Paper

The document was prepared in response to a recommendation by the 10th Session, in Korea in 1962, of the Indo-Pacific Fisheries Council, that a bibliography be prepared on the induction of spawning in fish. It supplements the list of references in "The Physiology of the Pituitary Gland of Fishes",* which covered the literature through the first half of 1956; it also contains a few earlier references overlooked by the authors during the preparation of that book. In an effort to make the present bibliography as useful as possible to fish culturists, items have been included that deal with the influence of the environment on spawning and the cyclical changes in gonads of fish. Because the authors believe that a broad approach to any practical biological problem is more likely to be successful than a narrow one, they have also included references on the relationship of other glands and neurosecretion to reproduction in fish, and have listed the papers on cyclostomes, elasmobranchs and bony species not reared in captivity. Academically oriented experimentalists as well as fish culturists should therefore find their bibliography useful.

This work was supported by N.S.F. Grant GB 0132 to Grace E. Pickford. The authors also wish to acknowledge help received from the Aquatic Sciences Information Retrieval Center at the University of Rhode Island.

The first 352 references are listed alphabetically by author; the remaining are out of order in the addendum. There are indexes by subject, species, and author index, including second and third authors.

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* Grace E. Pickford and James W. Atz (1957). New York Zoological Society, New York, N.Y.; reprinted in 1963.

Préparation de ce document

Le document a été préparé à la suite d'une recommandation de la 10ème Session du Conseil Indo-Pacifique des Pêches, Corée 1962, demandant qu'une bibliographie soit établie sur les moyens d'induire le poisson à se reproduire. Ce document complémente la liste de références qui se trouve dans "The Physiology of the Pituitary Gland of Fishes"* et qui rassemble la littérature jusqu'à la moitié de 1956. Ce document contient, en outre, quelques références antérieures à cette date qui avaient échappé aux auteurs lors de la préparation du livre. Afin de rendre cette bibliographie plus utile pour les pisciculteurs, des informations concernant l'influence de l'environnement sur la ponte et les changement cycliques des gonades du poisson ont été incluses. Les auteurs sont d'avis qu'une vue d'ensemble de tout problème biologique d'ordre pratique porte plus de fruits qu'un examen détaillé de ce problème, ils ont inclus des références sur la relation des autres glandes et sécrétions neurales par rapport à la reproduction du poisson et ont donné la liste des documents sur les cyclostomes, les élasmobranchies et les espèces osseuses qui ne sont pas élevées en captivité. Les spécialistes qui effectuent des expériences ainsi que les pisciculteurs devraient donc trouver cette bibliographie utile.

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* Grace H. Pickford et James W. Atz (1957) New York Zoological Society, New York, N.Y. - réimprimé en 1963.

Ce travail a reçue l'appui de N.S.F. Grant GB 0132 offert à Grace E. Pickford. Les auteurs désirent remercier aussi "Aquatic Sciences Information Retrieval Center" de l'Université de Rhode Island pour l'aide qu'il a bien voulu leur accorder.

Les premières 352 références sont données par ordre alphabétique des auteurs; les autres figurent sans ordre préétabli en addendum. Les index sont par sujets, espèces et auteurs (y compris les deuxième et troisième auteurs).

Preparación de este documento

Este documento ha sido preparado en respuesta a una recomendación hecha por la 10ª Reunión del Consejo de Pesca del Indo-Pacífico, que tuvo lugar en Corea en 1962, según la cual debería prepararse una bibliografía sobre la inducción del desove de los peces. Es un suplemento de la lista de referencias dadas en "La fisiología de la glándula pituitaria de los peces",* que comprende las publicaciones hechas hasta la primera mitad de 1956 así como algunas referencias de fecha anterior, que fueron omitidas por los autores durante la preparación de aquel libro. Con el proposito de hacer esta bibliografía todo lo útil posible a los piscicultores, se han incluído temas referentes a la influencia del ambiente sobre el desove y los cambios cíclicos de las gónadas de los peces. Siendo opinión de los autores que un enfoque amplio de los problemas biológicos prácticos puede dar mejores resultados que uno limitado, han incluído también referencias sobre la relación de las otras glándulas y de la neurosecreción en la reproducción de los peces, y han puesto en la lista documentos sobre ciclostomas, elasmobranquios y especies oseas no criadas en cautividad. Los experimentadores con orientación académica así como los piscicultores encontrarán que es una valiosa bibliografía.

Este trabajo ha sido sustentado por una beca GB 0132 de la "National Science Foundation" otorgada a la Sra. Grace E. Pickford. Los autores desean agradecer también la ayuda recibida del "Aquatic Sciences Information Retrieval Center" de la Universidad de Rhode Island.

Las primeras 352 referencias van en orden alfabético de autores, las otras se incluyen sin orden especial en el apéndice. Hay índices por temas, especies y autores, incluyendo los autores mencionados en segundo y tercer lugar.

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* Grace E. Pickford and James W. Atz (1957). New York Zoological Society, New York, N.Y.; reimpreso en 1963.

Distribution

FAO Fisheries Division
FAO Regional Fisheries Officers
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IPFC 11th Session
Selectors 2, 5 and 7

"Current Bibliography" entry:

Atz, J.W. and G.E. Pickford 9-04594 MF
(1964)
FAO Fish.Biol.tech.Pap., (37):61 p.
The pituitary gland and its relation to the reproduction of fishes in nature and in captivity. An annotated bibliography for the years 1956-1963

Serially numbered list of references arranged in alphabetic order of authors' names with author, subject and taxonomic indexes. Incl. addenda for entries new to main list.

THE PITUITARY GLAND AND ITS RELATION TO THE REPRODUCTION OF FISHES IN NATURE AND IN CAPTIVITY

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Adam, H. (1959) 001
Verh.dtsch.zool.Ges.Münster, 1959: 157-71
Hypophyse und hypothalamo-neurohypophysäres Neurosekretsystem bei den Cyclostomen Myxine glutinosa und Bdellostoma stouti (Hypophysis and Hypothalamic-neurohypophysial neurosecretory system in the cyclostomes Myxine glutinosa und Bdellostoma stouti)

Myxinoids possess a true hypophysis which can be divided into a neurohypophysial and adenohypophysial component. These and the neurosecretory system of the midbrain are described.

Ahmad, N. (1955) 002
J.zool.Soc.India, 7(1):101-3
Certain observations on the spawning of major carp in the river Halda of Chittagong (East Pakistan)

Spawning of Catla catla, Labeo rohita and Cirrhina mrigala correlated with flooding of areas and with new and full moon.

Albanese, M.P. and A. Bolognari (1959) 003
Atti Soc.pelor., 5(2/3):105-18
Esame morfologico e volumetrico dell'ipofisi di teleostei abissali e bentonici (Morphological and volumetric study of the hypophyses of deep-water and benthic fishes)

Deep-water species (Argyropelecus hemigymnus, Chauliodus sloanei, Gonostoma denudatum) and benthic species (Coris julis, Crenilabrus pavo) compared. Differences between sexes, but not between two ecological groups, found.

Albanese, M.P. and A. Bolognari (1960) 004
Atti Soc.pelor., 6(1):47-53
Ulteriori dati volumetrici sulla ipofisi dell'Engraulis del lago verde di Oliveri (Additional volumetric data on the hypophysis of Engraulis from the green lake of Oliveri)

The pituitaries of male and female Engraulis encrasicholus differ significantly in size, the females being larger.

Aliev, F. (1961) 005
Rybovod. i Rybolov., (5):14-6
(Ctenopharyngodon idella and Hypophthalmichthys molitrix in Turkmenia) In Russian

Acclimation described. Progeny obtained from acclimated fish by pituitary injections.

Alikunhi, K.H., M.A. Vijayalakshmanan and K.H. Ibrahim (1960) 006
Indian J.Fish., 7(1):1-19
Preliminary observations on the spawning of Indian carps, induced by injection of pituitary hormones

Description of successful treatment of Labeo rohita with fresh or absolute alcohol-preserved glands from the same species, L. calbasu with preserved glands from L. rohita and L. bata with fresh or preserved glands from L. rohita.

Anonymous (1962) 007
Rep.Fish.Res.Bd Can., 1961:163-4
Assay of fish pituitary gonadotropins

Salmon pituitary extract causes increase in weight of testis and ovary in trout, but reaction is slow and influenced by temperature. Betta splendens exhibited ovarian stimulation and might be a suitable assay animal. Reactions of male Rana pipiens (Galli-Mainini test) were inconsistent.

Anpilova, V.I. (1959) 008
Dokl.Akad.Nauk SSSR, 129(5):1162-4
(Effect of temperature on the sexual ripening of baunt whitefish Coregonus laveratus baunti /Muchomedijarov/)
In Russian

Relatively high water temperatures (13.5 - 17.5°C.) required through summer for oocytes to change from protoplasmic to trophoplasmic growth.

Anpilova, V.I. (1959) 008
Dokl.Akad.Nauk SSSR (En Transl.biol. Sci.Sec.), 129(1/6):983-5
Effect of temperature on the sexual ripening of the baunt whitefish Coregonus laveratus baunti /Muchomedijarov/ In English

Aronson, L.R. (1959) 009
In Comparative Endocrinology edited by Aubrey Gorbman. New York, John Wiley & Sons, pp.98-120
Hormones and reproductive behavior: some phylogenetic considerations

Effects of castration compared in the various groups of vertebrates, including fishes. Data on Aequidens latifrons and Xiphophorus maculatus presented. Some observations and experiments indicate that pituitary hormones influence sex behavior directly without the mediation of gonadal hormones.

Arvey, L., M. Fontaine and M. Gabe (1959) 010
J.Physiol.Path.gén., 51(6):1031-85
La voie neurosécrétrice hypothalamo-hypophysaire des téléostéens (The hypothalamic-hypophysial neuro-secretory process in teleosts)

Morphology, histology and histo-chemistry of the preoptico-hypophysial tract, the neuro-hypophysis and the secretions associated with them are described and discussed, particularly in relation to Salmo salar and its migrations.

Atz, J.W. and G.E. Pickford (1959) 011
Endeavour, 18(71):125-9
The use of pituitary hormones in fish culture

Brief history of breeding captive food fishes given, including pituitary treatment in Brazil, the U.S.S.R., India and the U.S.A. Specificity of gonadotrophins, the presence of LH- and FSH-like hormones in the fish pituitary, and the role of the environment in stimulating the pituitary are discussed.

Baggerman, B. (1957) 012
Arch.néerl.Zool., 12(2):105-317
An experimental study on the timing of breeding and migration in the three-spined stickleback (Gasterosteus aculeatus L.)

Role of pituitary discussed in detail. Effects of light and temperature experimentally analyzed. Castration and administration of PU derivatives also studied.

Baggerman, B. (1960) 013
Symp.zool.Soc.Lond., 1:33-60
Factors in the diadromous migrations of fish

Direct and indirect influence of pituitary hormones discussed, particularly in relation to the migrations of Gasterosteus aculeatus and the salmons.

Baker, B.I. (1963) 014
C.R.Acad.Sci., Paris, 256(15):3356-8
Comportement en culture organo-

typique des cellules de l'hypophyse de la truite (Behavior of cells from the hypophysis of the trout in organotypic cultures)

Cytologic from neuro-adenohypophysis showed cytoplasmic changes but rarely became degranulated. It is not yet possible to culture pituitary cells without neurohypophysial ones because of the intimate association of the two in the gland. Salmo trutta studied.

Zakar-Cohen, N. (1961) 015
Zoologica, N.Y., 46(4):181-202
The role of the thyroid in the development of platyfish

Total radiothyroidectomy of Lophogobius maculatus strongly indicates importance of thyroid to development of gonads. Effects of P^{32} on gonads described.

Bell, J.N. (1960) 016
Symp.zool.Soc.(Lond.), 1:135-75
Reproduction in female bony fishes

Critical analysis of the role of the pituitary and other endocrines. Cellular origin of gonadotrophins discussed. Function of corpora lutea and source of estrogens also treated.

Bell, J.N. (1961) 017
Nature, Lond., 194 (4830):737
Brood-production after hypophysectomy in the viviparous teleost Mnaiemensis lampeyana Le Sueur

Adenohypophysial hormones are not involved in maintaining gestation, nor in the ovulation-like release of young from the follicles, since hypophysectomy of gravid females does not interfere with the development of the brood or its birth. Vitellogenesis is pituitary-dependent.

Bara, G. (1960) 018
Istanbul Univ.Fen Fak.Mecm., (Serie B) 25(1-2):49-91
(Histological and cytological changes in the ovaries of the mackerel Scomber scomber L. during the annual cycle) With Turkish summary

Ontogenetic and seasonal changes described and discussed, including origin of oocytes, behavior of chromosomes, role of mitochondria, formation of zona radiata, ovulation and formation of corpora lutea.

Barannikova, I.A. (1957) 019
Uchen.Zap.Leningr.Univ.(Biol.), (188):54-71
(Biological differentiation of the school of the Volga-Caspian sturgeon) In Russian

Pituitary treatment of Acipenser gueldenstaedti belonging to different seasonal races described.

Barannikova, I.A. (1961) 020
Dokl.Akad.Nauk SSSR, 116(3):730-3
(The functional morphology of the hypothalamo - hypophysial neurosecretory system in salmon at different stages of the life cycle) In Russian

Changes in neurosecretory centers of diencephalon, hypophysis, and thyroid are correlated with spawning and anadromous and catadromous migration in Salmo salar and Oncorhynchus keta.

Barannikova, I.A. (1961) 020
Dokl.Akad.Nauk SSSR (Sv.Trudy) Biol.Sci.Sec. 135(1-6):171-6
The functional morphology of the hypothalamo - hypophysial neurosecretory system in salmon at different stages of the life cycle In English

Barannikova, I.A. and A.L. Polenov 021
(1960)
Dokl.Akad.Nauk SSSR, 133(3):719-21
(An ecological and histophysiological analysis of the preoptic-pituitary neurosecretory system in the Acipenseridae) In Russian

Changes in neurosecretory centers in brain, and in hypophysis and thyroid are correlated with stages in life cycles of Acipenser gueldenstaedti and Huso huso belonging to different biological races. Origin of

neurosecretory granules discussed.

Barannikova, I.A. and A.L. Polenov (1960) 021
Dokl.Akad.Nauk SSSR (En Transl.biol. Sci.Sec.), 133(1/6):611-4
An ecological and histophysiological analysis of the preoptic-pituitary neurosecretory system in the Acipenseridae In English

Barr, W.A. (1963) 022
Gen.comp.Endocrin., 3(3):197-225
The endocrine control of the sexual cycle in the plaice, Pleuronectes platessa (L). 1. Cyclical changes in the normal ovary. 2. The endocrine control of oogenesis. 3. The endocrine control of spermatogenesis

Hypophysectomy halts spermatogenesis but not spermiation. It prevents growth and maturation of oocytes. Replacement therapy successful. Technique of operation and care of fish described.

Barrington, E.J.W. (1960) 023
Symp.zool.Soc.Lond., 2:69-84
Some problems of adenohypophysial relationships in cyclostomes and fish

Relation of thyroid to reproduction briefly discussed. Role of neurohypophysial hormones also analyzed.

Beach, A.W. (1959) 024
Canad.J.Zool., 37(5):615-25
Seasonal changes in the cytology of the ovary and of the pituitary gland of the goldfish

Changes in pituitary correlated with those in ovary. Structure and function of corpora lutea discussed.

Bekker, V.E. (1958) 025
Dokl.Akad.Nauk SSSR, 117(5):889-91
(On the influence of environmental conditions on gonad development and spawning intensity in the goldfish (Carassius carassius L.)) In Russian

Probably the Crucian carp, not the goldfish, Carassius auratus. Crowding leads to reduction of spawning, resorption of eggs. Mutual disturbance of fish believed to be cause.

Becker, V.E. (1958) 025
Dokl.Akad.Nauk SSSR (En Transl. biol.Sci.Sec.), 117(1/6):960-3
On the influence of environmental conditions on gonad development and spawning intensity in the goldfish (Carassius carassius L.) In English

Bekker, V.E. (1958) 026
Dokl.Akad.Nauk SSSR, 121(6)1086-9
(The peculiar features of the vitellogenesis in females of Carassius carassius (L.) under conditions of increased population density) In Russian

Vitellogenesis in golden carp described, and amount of food considered critical. Injection of fish that were crowded did not induce them to spawn.

Becker, V.E. (1958) 026
Dokl.Akad.Nauk SSSR (En Transl. biol.Sci.Sec.), 121(1/6):559-62
The peculiar features of the vitellogenesis in females of Carassius carassius (L.) under conditions of increased population density In English

Bena, J. (1956) 027
Čsl.Rybářst., (5):72
Zkušenosti s hypofysací kapra

An account of experiments with pituitary injections given to Cyprinus carpio during the years 1953-1955, in Czechoslovakia.

Berg, L.S. (1959) 028
J.Fish.Res.Bd Can., 16(4):515-37
Vernal and hiemal races among anadromous fishes (Translated from the Russian by William E. Ricker)

Typically, two biological or seasonal races exist in each river system the species inhabits. Vernal races enter at warmer temperatures and spawn soon afterward, while hiemal races do not spawn for a considerable length of time. Sturgeons, salmonids, lampreys, cyprinids, and Lucioperca discussed. This paper first appeared in 1934, in the USSR.

Bhimachar, B.S. (1958) 029
Indian J.Fish., 5(2):440-71
Annual report of the Central Inland Fisheries Research Station, Calcutta, for the year 1956-57

Pseudeutropius atherinoides, Rohtee cotio, and Perilampus sp. treated with pituitary, the first species successfully.

Bhimachar, B.S. (1959) 030
Indian J.Fish., 6(2):461-505
Annual report of the Central Inland Fisheries Research Station, Calcutta, for the year 1957-58

Labeo rohita, L. calbasu, L. bata, Cirrhina mrigala, C. reba, and Barbus sarana treated successfully with fish pituitary glands. Treatment of non-ripe fishes attempted. Slight success with ripe Mugil.

Bhimachar, B.S. (1959) 031
Sci. & Cult., 24(12):545-54
Inland fisheries of India and their problems

Brief description of status of pituitary treatment to obtain fish seed.

Bhimachar, B.S. (1960) 032
Indian J.Fish., 7(2):553-99
Government of India annual report of the Central Inland Fisheries Research Station, Barrackpore, for the year 1959-60

Catla catla, Cirrhina mrigala, C. reba, Labeo rohita, and L. calbasu treated successfully with fish pituitary glands. Cyprinus carpio and excellent donor, and other evidence of non-specificity obtained. Glands from immature fish not potent.

Billenstien, D.C. (1963) 033
Z.Zellforsch., 59(4):507-12
Neurosecretory material from the nucleus lateralis tuberis in the hypophysis of the eastern brook trout, Salvelinus fontinalis

Material in gland stainable with azocarmine or acid fuchsin, but not with chrome alum hematoxylin or aldehyde fuchsin, thought to originate from n.l.t. Control of gonadotrophin secretion by n.l.t. discussed.

Bilyi, M.D. (1959) 034
Kolhospnyk Ukrainy, 6(10):25-
(Obtaining roe in artificial spawning grounds) In Russian or Ukrainian

Bjorklund, R.G. (1958) 035
Dissert.Abstr., 19(6):1423
The biological function of the thyroid and the effect of length of day on the growth and maturation of the goldfish Carassius auratus (Linnaeus)

No particular ration of light is necessary for normal sexual maturation. Keeping immature males in darkness ten months and females nearly four did not prevent maturation.

Blanco, G.J. and P.A. Acosta 036
Philipp.J.Fish., 6(1):1-5
The propagation of the grey mullet in northern Luzon brackish-water fishponds

Mugil cephalus most important of all mullets in P.I., but not yet cultivated on large scale.

Boëtius, J., I. Boëtius, A.M. Hemmingsen, A.F. Bruun and E. Møller-Christensen (1962) 037
Medd.Danm.Fisk.Havundersøg., (n.s.), 3(7):183-98

Studies of ovarial growth induced by hormone injections in the European and American eel (Anguilla anguilla L. and Anguilla rostrata Le Sueur)

Treated with chorionic gonadotrophin and estrogens together. Ovaries increased in weight and eggs in diameter, but fish died before maturing. Changes in eyes, jaws, and coloration described.

Bogoslovskaia, E.I. (1960) 038
Nauch.Dokl.vyssh.Shk.(biol.), (1):21-6
(The corpus luteum in the gonads of fishes) In Russian

Resorption of oocytes in pike and Crucian carp studied. Large number of corpora lutea considered indicative of unfavorable spawning conditions.

Bone, Qu. (1958) 039
Pubbl.Sta.zool.Napoli, 30(3):458-71
Observations upon living larva of amphioxus

Mammalian gonatotrophin not effective on specimens collected in Bay of Naples.

Bowers, A.B. and F.G.T. Holliday 040
(1961)
Mar.Res., (5):16 p.
Histological changes in the gonad associated with the reproductive cycle of the herring (Clupea harengus L.)

Details of gametogenesis of both sexes provided. No interstitial tissue recognized. All eggs ovulated together. Pre- and post-ovulatory degeneration described.

Bowers, A.B. and F.G.T. Holliday 041
(1961)
Rep.Challenger Soc., 3(13):27-8
Histological changes associated with the reproductive cycle of herring in the sea and in aquaria

In captivity, maturation of Clupea harengus proceeded to advanced stage if high level of feeding was maintained. Regression of oocytes followed.

Brehm, H. von (1958) 042
Z.Zellforsch., 49(1):105-24
Über Jahreszyklische Veränderungen in Nucleus Lateralis Tuberis der Schleie (Tinca vulgaris) (On the annual, cyclical changes in the nucleus lateralis tuberis of the tench (Tinca tinca))

Changes in neurosecretory center associated with reproduction.

Bugniţă, A. and L. Cautis (1963) 043
Bul.Inst.Cerc.pisc., 22(1):21-9
La reproduction de la carpe. (2) Données préliminaires. Recherches et expérimentation au Centra Ovidiu (region Constanţa) (Reproduction in the carp. (2) Preliminary data. Research and experiments at the Ovidiu Center (Constanţa region)) In Rumanian with Russian and French summaries

By increasing the temperature of the water and injecting pituitaries, maturation of Cyprinus carpio was advanced up to one and a half months.

Carlisle, D.B. (1958) 044
In Zweites Internationales Symposium über Neurosekretion ed. by W. Bargmann et al., Berlin Springer-Verlag:pp.18-9
Neurosecretory transport in the pituitary stalk of Lophius piscatorius

Material observed moving down nerve at 100 to 200 micra per minute. Studied under polarized light, and oscilloscope readings of action potentials taken.

Carlson, I.H. and W.N. Holmes 045
(1962)
J.Endocrin., 24(1):23-32

Changes in the hormone content of the hypothalamo-hypophysial system of the rainbow trout (Salmo gairdnerii)

Handling leads to an increase in pituitary and hypothalamic neurosecretory material. Transfer from fresh water into sea water leads to a significant reduction in it.

Chaturvedi, R.N. (1962) 046
Indian Fmg., 12(2):9-10
With pituitary extract pond carp can be coaxed to spawn

Chaudhuri, H. (1959) 047
Sci.&Cult., 25(4):258-9
Notes on external characters distinguishing sex of breeders of common Indian carps

Sex of Catla catla, Cirrhina mrigala, C. reba, Labeo rohita, L. calbasu, L. gonius, L. bata, and L. pangusia determined by roughness of dorsal surface of pectoral fins of males. Use of fish in pituitary injections described.

Chaudhuri, H. (1960) 048
Indian J.Fish., 7(1):20-48
Experiments on induced spawning of Indian carps with pituitary injections

Details of techniques employed to induce spawning in Cirrhina mrigala, C. reba, Labeo rohita, and Puntius sarana with fish pituitary injections. Problems of determining ripeness, standardizing doses, specificity of gonadotrophins, and effects of environment discussed. Cool, rainy days usually associated with successful spawnings.

Chaudhuri, H. and K.H. Alikunhi (1957) 049
Curr.Sci., 26(12):381-2
Observations on the spawning in Indian carps by hormone injection

Cirrhina mrigala, C. reba, Labeo rohita, L. calbasu, L. bata, and Puntius (Barbus) sarana spawned following intramuscular injections of alcohol-preserved fish pituitaries.

Cheng, Tien-hsi (1961) 050
Publ.Amer.Ass.Advanc.Sci., (68):197-226
Zoological sciences since 1949

Pituitary glands of Cyprinus carpio used successfully to induce precocious breeding in Chinese pond carps, according to the February 1956 issue of K'o Hsueh T'ung Pao (Bull.Biol.).

Chicewicz, M. (1959) 051
Zesz.nauk.wyzsz.Szk.roln.Olsztyn, 9(64):16
Histological changes occurring in gonads and pituitary gland of Lucioperca lucioperca L. in annual cycle. 1. Changes in gonads

Five stages in oogenesis and four in spermatogenesis recognized.

Chieffi, G. (1961) 052
Pubbl.Sta.zool.Napoli, 32(2): 145-66
La luteogenesi nei selaci ovovivipari. Ricerche istologiche e istochimiche in Torpedo marmorata e Torpedo ocellata (The luteinization of ovoviviparous elasmobranchs. Histological and histochemical investigations in Torpedo marmorata and Torpedo ocellata)

Development and fate of corpora lutea described, and their function discussed. Their number increases during period of gravidity and may be correlated with increase in length of uterine folds.

Chieffi, G. (1962) 053
Gen.comp.Endocrin., Suppl. 1: 275-85
Endocrine aspects of reproduction in elasmobranch fishes

Changes in the pituitary that accompany gestation in Torpedo

marmorata and egg-laying in Scyliorhinus stellaris described. Gonadal morphology and hormones discussed, including role of corpora lutea.

Chieffi, G. and V. Botte (1961) 054
Boll.Zool., 28(2):203-7
La luteogenesi in Scylliorhinus stellaris (sic) selacio oviparo (Luteinization in Scyliorhinus stellaris, an oviparous elasmobranch)

Development and function of corpora lutea described and discussed. Glandular structure is formed, but no sign of steroid metabolism can be found.

Clemens, H.P. and K.E. Sneed (1957) 055
Spec.sci.Rep.U.S.Fish Wildl.Serv.-Fish., (219):11 p.
The spawning behavior of the channel catfish Ictalurus punctatus

Spawning induced in females by several injections of fresh or acetone-dried fish pituitaries. No details given of procedure.

Clemens, H.P. and K.E. Sneed (1962) 056
Res.Rep.U.S.Fish Serv., (61):30 p.
Bioassay and use of pituitary materials to spawn warm-water fishes

Numerous experiments showing lack of specificity of fish gonadotrophins and of seasonal or sex variation in potency of pituitaries described. Technical details for treating Carassius auratus, Cyprinus carpio, Brachydanio rerio, Notemigonus crysoleucas, Notropis spp., Ictalurus punctatus, Pylodictis olivaris, Roccus chrysops, Pomoxis annularis, and Ambloplites rupestris presented.

Combs, B.D. and R.B. Burrows (1959) 057
Progr.Fish Cult., 21(4):165-8
Effects of injected gonadotrophins on maturation and spawning of blueback salmon

Treatment of male and female Oncorhynchus nerka, two months from spawning, with salmon pituitaries advanced maturity slightly, but lowered production of young. Carp and horse glands were ineffective, as was estradiol. Gelatin and cholesterol used to delay absorption of hormones.

Combs, B.D., R.E. Burrows, and R.G. Bigej (1959) 058
Progr.Fish Cult., 21(2):63-9
The effect of controlled light on the maturation of adult blueback salmon

Spawning of Oncorhynchus nerka delayed by lengthening daily light exposure and advanced by shortening it. Light more important than water temperature.

Cridland, C.C. (1962) 059
Hydrobiologia, 20(2):155-66
Laboratory experiments on the growth of Tilapia spp. The effect of light and temperature on the growth of T. zilli in aquaria

Strong 12-hour photoperiods appear to delay sexual maturity of young fish. Sexual maturity delayed by low temperature. Effects on growth and mortality also described.

Cristian, A. (1952) 060
Bul.Inst.Cerc.pisc., 11(3):19-24
Experiente pentru grabirea maturatiei sexuale a crapului sub actinunea injectiilor hipofizare

Pituitary injections given to Cyprinus carpio in Romania.

Cristian, A., A. Nicolau, P. Grozavu, S. Luscan, and M. Ionescuvaro (1963) 061
Bul.Inst.Cerc.pisc., 22(1):5-20

La reproduction précoce de la carpe. (1) Données préliminaires. Recherches et expérimentation à

la Station Nucet (Precocious reproduction in the carp. (1) Preliminary data. Research and experiments at the Nucet Station) In Rumanian with Russian and French summaries

By increasing the temperature of the water and pituitary injection, maturation of Cyprinus carpio was advanced about one month.

Da Lage, C. (1955) 062
C.R.Ass.Anat., 42:1454-9
Étude supraviatle de 1'hypophyse de 1'hippocampe en microscopie à contraste de phase (Supra-vital study of the hypophysis of the sea-horse by means of phase contrast microscope)

Fresh pituitaries of Hippocampus guttulatus gave evidence for the existence of neurosecretory endings among cells of the adenohypophysis.

Da Lage, C. (1957) 063
C.R.Ass.Anat., 44:235-40
Étude supravitale de 1'hypophyse de 1'hippocampe en microscopie à contraste interférentiel (Supra-vital study of the hypophysis of the seahorse by means of inter-ference-contrast microscope)

Fresh pituitaries of Hippocampus guttulatus provided confirmation that the adenohypophysis and neurohypophysis are connected by nerves that end among the basophils.

Da Lage, C. (1958) 064
Pathophysiologia Diencephalica, Symp.Int., Milan:118-21
L'innervation neurosécrétoire de 1'adénohypophyse chez quelques syngnathidés (Neurosecretory innervation of the adenohypophysis in certain syngnathids)

Observations on Hippocampus brevirostris, Syngnathus acus, Nerophis ophidion and Typhle hexagonus indicate that the same relations hold as the author found in Hippocampus guttulatus.

Da Lage, C. (1958) 065
C.R.Acad.Sci., Paris, 246(25): 3517-8
La vascularisation de la région hypothalamo-hypophysaire chez 1'hippocampe (The vasculari-zation of the hypothalamo-hypophysial region in the sea-horse)

In Hippocampus, no blood vessels connect hypothalamus with pituitary. Instead, certain capillaries reach the adenohypo-physis after traversing the pars nervosa. Direct nervous control by means of fibers coming from the preoptic nuclei is also possible.

Da Lage, C. (1958) 066
Arch.Anat.micr.Morph.exp., 47(3):401-45
Recherches sur le complexe hypo-physaire de 1'hippocampe (Studies on the hypophysial complex of the seahorse)

Morphology, cytology and vascularization of the pituitary of Hippo-campus guttulatus, particularly in relation to neurosecretion.

David, A. (1959) 067
Indian J.Fish., 6(2):327-41
Observations on some spawning grounds of the gangetic major carps with a note on carp seed resources in India

Overflow channels (dhars), which are formed during the annual floods, provide the most extensive areas. Old, silted-up river-beds (jheels) are also important. Spawning occurs during a limited period, only when flooding first takes place. Catla catla, Cirrhina mrigala and Labeo rohita studied. Included is a map showing the location of places where fish seed is obtained.

Della Corte, F. (1961) 068
Arch.zool.ital., 46:227-71
Struttura, tipi cellulari e dati istochimici dell'ipofisi di Scylliorhinus stellaris (L.), anche

in rapporto all'attività sessuale (Structure, cell types and histochemical data of the hypophysis of Scyliorhinus stellaris (L.), in relation to sexual activity) English summary

Variation associated with sex, age and season of the year described. Cells responsible for production of various hormones tentatively identified.

Della Corte, F. (1961) 069
Boll.Zool., 28(2):485-91
L'ipofisi de Scylliorhinus stellaris (L.) durante la deposizione della uova (The hypophysis of Scyliorhinus stellaris (L.) at the time of egg-laying) English summary

Changes in cytology associated with secretion of gonadotrophins.

Della Corte, F. and G. Chieffi (1961) 070
Boll.Zool., 28(2):219-25
Modificazioni dell'ipofisi di Torpedo marmorata Risso, durante la gravidanza. Nota preliminare (Modifications of the hypophysis of Torpedo marmorata Risso during gravidity. Preliminary note) English summary

Changes in cells in various lobes described. These are associated with conditions before, during and after the carrying of embryos.

Della Corte, F. and G. Chieffi (1961) 071
Arch.ital.Anat.Embriol., 66(4): 313-39
Morfologia e citologia dell'ipofisi di Torpedo marmorata Risso, nei giovani, nei ♂♂ adulti in spermatogenesi e nelle ♀♀ adulte in vari stadi dell'attività sessuale (Morphology and cytology of the hypophysis of Torpedo marmorata Risso, immatures, males exhibiting spermatogenesis and adult females in different stages of sexual activity) English summary

Differences in cytology among various cell types associated with the production of different hormones.

Deminatti, M. (1962) 072
C.R.Soc.Biol., Paris, 156(11): 1924-6
Étude histoautoradiographique et biochemique de la préhypophyse de Carassius auratus, après administration de $^{35}SO^4N^2$. (Histoautoradiographic and biochemical study of the anterior pituitary of Carassius auratus following the administration of $Na_2S^{35}O_4$)

Twenty-four hours after injection, maximum radioactivity was localized in PAS-, alcian blue- and aldehyde fuchsin Gomori- positive cells.

Dodd, J.M. (1960) 073
In Marshall's physiology of reproduction edited by A.S. Parkes. London, Longmans Green & Co. Ltd., Vol. 1, Pt. 2:417-582
Gonadal and gonadotrophic hormones in lower vertebrates

A balanced and integrated review of all aspects of the relation of the pituitary of cyclostomes, elasmobranchs and bony fishes to reproduction.

Dodd, J.M., P.J. Evennett, and C.K. Goddard (1960) 074
Symp.zool.Soc.Lond., 1:77-103
Reproductive endocrinology in cyclostomes and elasmobranchs

Morphology and reproductive physiology described including effects of partial and complete hypophysectomy, gonadectomy, and administration of exogenous hormones.

Egami, N. (1957) 075
J.Fac.Sci.Hokkaido, (6), 13(¼): 369-72
Production of testis-ova in adult males of Oryzias latipes 8.

Effect of administration of desiccated frog pituitary on testis-ovum production in males receiving estrone pellet

Simultaneous administration greatly reduced oocyte production, but pituitary substance enhanced oocyte production when administered a week after estrogen.

Egami, N. (1959) 076
Annot.zool.jap., 32(1):13-7
Preliminary note on the induction of the spawning reflex and oviposition in Oryzias latipes by the administration of neurohypophysial substances

Injection of mammalian neurohypophysial extract resulted in spawning actions by males and females. Ovulated eggs were laid. The extract failed to exert any effects on female reproductive organs in vitro.

Egami, N. (1959) 077
J.Fac.Sci.Univ.Tokyo (4), 8(3): 539-48
Effects of exposure to low temperature on the time of oviposition and the growth of the oocytes in the fish, Oryzias latipes

Fish kept at 4-8°C. for 2 to 24 hrs., which delayed egg-laying and almost completely inhibited growth of oocytes.

Egami, N. (1960) 078
J.Fac.Sci.Univ.Tokyo (4), 9(1): 67-100
Comparative morphology of the sex characters in several species of Japanese gobies, with reference to the effects of sex steroids on the characters

Hypophysectomy of Chasmichthys gulosus results in marked retrogressive changes in the reproductive system. Castration and androgen administration showed that not all sexually dimorphic characters in various species are influenced by sex steroids.

Egami, N. and S. Ishii (1962) 079
Gen.comp.Endocrinol., Suppl.1: 248-53
Hypophysial control of reproductive functions in teleost fishes

Role of neurohypophysial hormones in egg-laying of Oryzias latipes and prolactin in production of "skin-milk" of Symphysodon discus described. Reserpine and other blocking agents have a stimulatory effect on the growth of the ovary in Oryzias. The interaction of estrogens, neurohypophysial hormones and prolactin in the maintenance of gestation and in egg-laying or the delivery of young is discussed.

Egami, N. and M. Nambu (1961) 080
J.Fac.Sci.Univ.Tokyo (4), 9(2): 263-78
Factors initiating mating behavior in the fish, Oryzias latipes

Female senses male mostly with lateral line system, and nerve impulses are conducted to the neurohypophysis, stimulating it to secrete hormones. When hormone secretion attains its peak during the course of mating, oviposition occurs.

Etienne, N. (1959) 081
C.R.Soc.Biol., Paris, 153(1):41-4
Influence de la maturation sexuelle provoquée sur l'activité thyroïdienne de l'anguille européenne mâle, Anguilla anguilla L. (Influence of induced sexual maturation on thyroid activity in the male European eel, Anguilla anguilla L.)

Prolan injections brought about external changes and production of milt. Treated fish had more active thyroid glands than controls.

Evennett, P.J. and J.M. Dodd (1963) 082
Nature, Lond., 197(4868):715-16
Endocrinology of reproduction in the river lamprey

Either gonadectomy or hypophysectomy of Lampetra fluviatilis prevents development of secondary sex characters. Hypophysectomy of males with spermatogonia merely delays formation of spermatozoa; later stages not affected. Hypophysectomy of females prevents development of eggs, but there is no atresia. Replacement therapy with lamprey pituitary, CG or PMS leads to ovulation, with testosterone to secondary sex characters.

Bennett, P.J. and J.M. Dodd (1963) 083
J.Endocrin., 26(1):xiv-xv
The pituitary gland and reproduction in the lamprey

See previous abstract (082). Removal of meso-adenohypophysis has same effect as total hypophysectomy, and it shows seasonal changes.

Fiedler, K. (1962) 084
Zool.Jb.allgem.Zool., 69(4):609-20
Die Wirkung von Prolactin auf das Verhalten des Lippfisches Crenilabrus ocellatus (Forskål)
(The effect of prolactin on the behavior of the wrasse Crenilabrus ocellatus (Forskål))

Prolactin induces prolonged fanning in males, this behavior being a part of normal egg-care.

Follenius, E. (1959) 085
Ann.Endocrin., 20(5):676-82
Étude histo- et cytochimique de l'hypophyse du cyprinodonte vivipare Lebistes reticulatus R. 1. Limites et rapports entre la métaadénophyse et les autres parties de l'hypophyse (Histo- and cytochemical study of the hypophysis of the viviparous cyprinodont Lebistes reticulatus R. 1. Boundaries and relationships between the meta-adenohypophysis and the other parts of the hypophysis)

Detailed description of the gland, including the meso-adenohypophysis, but gonadotrophs not mentioned.

Follenius, E. (1961) 086
C.R.Acad.Sci., Paris, 253(7):1015-7
Comparison des relations vasculaires hypothalamohypophysaires chez quelques espèces de téléostéens (Comparison of vascular, hypothalamic-hypophysial relationships in some species of teleosts)

In Rhodeus, Leuciscus, Carassius, Ameiurus (Ictalurus), Panchax (Aplocheilus), Xiphophorus, Mollienesia, Lebistes, and Perca. Arterial vascular supply varies greatly. A capillary rosette, perhaps analagous to the mammalian portal system, exists only in the first four genera.

Follenius, E. (1962) 087
C.R.Acad.Sci., Paris, 255(25):3474-6
Rapports neurovasculaires et neuroglandulaires dans l'hypophyse de quelques poissons. Étude au microscope électronique (Neurovascular and neuroglandular relationships in the hypophysis of certain fishes. A study with the electron microscope)

An intrahypophysial neurohumoral relay exists in teleosts with neurosecretory fibers contacting capillaries within the neurohypophysis, as well as numerous neuroglandular junctions. Species studied: Salmo sp., Phoxinus phoxinus, Lebistes reticulatus and Perca fluviatilis.

Follenius, E. and A. Porte (1961) 088
C.R.Soc.Biol., Paris, 155(1):128-31
Étude des différents lobes de l'hypophyse de la perche Perca fluviatilis L. au microscope électronique (Study of the different lobes of the hypophysis of the perch Perca fluviatilis L. with the electron microscope)

Follenius, E. and A. Porte (1961) 089
C.R.Acad.Sci., Paris, 252(20):3139-41
Chronologie de la différenciation des cellules hypophysaires (entre

15 et 45 jours) chez Lebistes reticulatus. Étude au microscope électronique (Chronology of the differentiation of hypophysial cells in Lebistes reticulatus from 15 to 45 days of age. A study with the electron microscope).

Follenius, E. and A. Porte (1962) 090
Mem.Soc.Endocrin., (12):51-69
Appearance, ultrastructure and distribution of the neurosecretory material in the pituitary gland of two teleost fishes Lebistes reticulatus R. and Perca fluviatilis L.

Fontaine, M. (1961) 091
C.R.Acad.Sci., Paris, 252(9): 1258-60
L'anguille européenne succombe-t-elle sans se reproduire? (Does the European eel die without reproducing?)

Administration alternately of prolan, serum gonadotropin and estradiol brought about significant maturation in female Anguilla anguilla. Treatment with thyroid stimulating hormone for one month caused ovaries and eggs to increase in size.

Fontaine, M. and M. Chauvel (1961) 092
C.R.Acad.Sci., Paris, 252(6):822-5
Évaluation du pouvoir gonadotrope de l'hypophyse des poissons téléostéens, et en particulier du Salmo salar L. à diversés étapes de son développement et ses migrations (Estimation of the gonadotrophic potency of the hypophysis of teleostean fishes, especially Salmo salar L. at different stages of its development and migrations)

Galli-Mainini test used to measure LH in pituitaries of Cyprinus, Conger, Salmo, and Anguilla. Carp (Cyprinus) 20 to 30 times more potent than salmon (Salmo) at spawning. At start of upstream migration and after spawning, salmon pituitary very low in LH.

Fontaine, Y.A. and E. Gérard (1963) 093
C.R.Acad.Sci., Paris, 256(26): 5634-7
Purification d'un facteur gonadotrope de l'hypophyse d'un téléostéen, la carpe (Cyprinus carpio L.) (Purification of a gonadotrophic factor from the hypophysis of a teleost, the carp (Cyprinus carpio L.))

Partial purification of a factor causing the liberation of sperm (Galli-Mainini test) in Rana esculenta. Similar to mammalian LH, but clearly distinguishable from it.

Fontenele, O. (1959) 094
Publ.Serv.Piscic., Fortaleza(1-C), (186):277-84
(Injecting pituitary(hypophysial) hormones into fish to induce spawning) In English

Procedures for collecting, preserving and extracting pituitaries of fishes for injection are described. Method of injection and care of fishes also included. This is a copy of Fontenele (1955) Progr.Fish Cult., 17(2):71-5, which was first republished ca. 1957 as Publ.Serv.Piscic., Fortaleza(1-C), (168).

Forbers, T.R. (1961) 095
In Sex and internal secretions, edited by W.C. Young, Baltimore, Williams & Wilkins Co.:1035-87
Endocrinology of reproduction in cold-blooded vertebrates

A review that includes pituitary function in fishes.

Forselius, S. (1957) 096
Zool.Bidr.Uppsala, 32:93-598
Studies of anabantid fishes. 1. A qualitative description of the reproductive behavior in territorial species investigated under laboratory conditions with special regard to genus Colisa. 2. Anatomy and histology of some endocrine organs. Quantitative

description of growth and nest-building activity. 3. A theoretical discussion of the differentiation, function, causation and regulation of reproductive behavior.

Detailed review of the literature. Behavior of Colisa lalia analyzed. Pituitary, neurosecretion, and corpus luteum formation described. Influence of environmental and endocrinological factors on spawning in nature discussed.

Fridberg, G. and B. Samuelsson (1959) 097
Acta zool., Stockh., 40(2/3):365-82
The secretory conditions in the praeoptico-hypophysial system of the roach (Leuciscus rutilus) and during the histogenesis

An ontogenetic study. Neurosecretory substance first found in pituitaries of 6.1 mm fish (when nektonic life commences), but not until a year later, at a size of 58 mm, was any seen in preoptic nuclei. Authors believe secretion occurs at first at submicroscopial level, being visible only in those peripheral places where it accumulates.

Fujita, T. (1963) 098
Z.Zellforsch., 60(1):147-62
Über das Zwischenhirn-hypophysen-system von Chimaera monstrosa
(On the diencephalon-hypophysis system of Chimaera monstrosa)

Pituitary is selachian-like. Its cells are described, among them PAS- and AF-positive ones that are considered to be thyrotrophs.

Galkina, L.A. (1959) 099
Dokl.Akad.Nauk SSSR, 126(2):404-5
(Degeneration of gametes in herrings of the Pacific) In Russian

On occasion whole schools of Clupea pallasii seem to fail to shed their eggs, which then undergo degeneration and resorption. Dead sperm found in living males under same conditions. Possible effect on future spawnings discussed.

Galkina, L.A. (1959) 099
Dokl.Akad.Nauk SSSR (Bn Transl. biol.Sci.Sec.), 126(1/6):431-2
Degeneration of gametes in herrings of the Pacific In English

Gerbil'skii, N.L. (1956) 100
Trud.karel.Fil.Akad.Nauk SSSR, 5:6-12
(The role of the nervous system in the completion of the process of transition of the fish into the spawning state) In Russian

Influence of hormones and environment analyzed. Sturgeon and carp discussed in detail.

Gerbil'skii, N.L. (1957) 101
Uchen.Zap.leningr.Univ.(biol.), 228:2-10
(Chief trends of the work of the expedition for the restoration of fish reserves in connection with hydro-construction) In Russian

Brief history of Russian work in treating sturgeon with pituitary substance to obtain eggs for fish cultural purposes given. All such eggs are now being obtained with the aid of pituitary injections.

Gerbil'skii, N.L. (1957) 102
Uchen.Zap.leningr.Univ.(biol.), (228):11-32
(The paths of development of intraspecific biological differentiation, types of anadromous migrants, and the problem of the migration impulse in acipenserines) In Russian

Considerations regarding the biological (seasonal) races of sturgeon that must be taken into account when treating these fishes with pituitary materials are discussed. The evolution of such races is suggested, and various biological features are pointed out, including those correlated with physical conditions found in different rivers.

Ghosh, A. and A.B. Kar (1952) 103
Proc.zool.Soc.Bengal, 5(1):29-48
Seasonal changes in the gonads of the common Indian catfish, Heteropneustes fossilis (Bloch)

No seasonal changes in males, but females show spectacular annual changes in ovaries.

Gidumal, J.L. (1958) 104
Hong Kong Univ.Fish.J., (2):1-6
A survey of the biology of the grass carp, Ctenopharyngodon idellus (Cuvier and Valenciennes)

Although gonads develop in pond-kept fish, their growth is retarded before they mature completely.

Godet, R. (1961) 105
C.R.Soc.Biol., Paris, 155(3):578-80
Étude expérimentale des relations intrahypophysaires chez le protoptère (Experimental study of intrahypophysial relationships in the African lungfish)

Blood vessels, pituitary stalk and gland itself transected to show course of neurosecretory materials, which enter through the posterior part. Protopterus aethiopicus studied.

Godet, R. (1961) 106
C.R.Acad.Sci., Paris, 252(16):2451-2
Étude expérimentale de la formation de mucus tégumentaire et de la réalisation du cocon chez le protoptère (Experimental study of the formation of integumentary mucus and the formation of the cocoon in the lungfish)

Involution of the anterior pituitary occurs as protopterus prepares to aestivate. Removal of this part of the gland in an active, aquatic fish results in the production of large quantities of mucus. The secretion of mucus appears to be inhibited by the anterior part of the gland.

Gokhale, S.V. (1957) 107
Indian J.Fish., 4(1):92-112
Seasonal histological changes in the gonads of the whiting, Gadus merlangus L., and the Norway pout, G. esmarkii Nilsson

Seasonal histological study of males and females. Interstitial tissue and corpus luteum discussed. Influence of temperature analyzed.

Grant, W.C. and G.E. Pickford (1959) 108
Biol.Bull., Woods Hole, 116(3):429-35
Presence of the red eft water-drive factor prolactin in the pituitaries of teleosts

By means of red eft stage of Diemyctylus viridescens, presence of prolactin in pituitary glands of Cyprinus carpio, Fundulus heteroclitus and Pollachius virens was revealed. Depletion during early spawning period suggested by data.

Green, J.D. and D.S. Maxwell (1959) 109
In Comparative endocrinology edited by A. Gorbman. New York, John Wiley & Sons, pp:368-92
Comparative anatomy of the hypophysis and observations on the mechanism of neurosecretion

General morphology described with special attention to the relation of the pituitary to nerves and blood vessels.

Guseinov, M.Sh. (1959) 110
Ryb.Khoz., (4):19-22
(Selection of breeders and securing ripe sturgeon roe) In Russian

Pituitary solution is injected intramuscularly in two places. Since males mature earlier, they should be treated a few hours later than females. Males can be injected several times at intervals of several days.

Hansen, K.L. and D.E. Sweat (1962) 111
Quart.J.Fla Acad.Sci., 25(2):109-20
Spermiation in Rana p. pipiens in response to heteroplastic pituitary materials

Pituitary from Lepisosteus gave positive response, but glands from Esox and Micropterus gave negative ones. Pituitaries from two sharks were negative, but ventral lobe may not have been included.

Harms, J.W. (1957) 112
Arch.esp.Morfol., 13(47/48):133-46
El time (The thymus)

Removal of the very large thymus of Sicyases sanguineus leads to a reduction in size of pituitary and areest of gonadal development, as changes in thyroid, skin and shape of body.

Harrington, R.W., Jr. (1959) 113
Publ.Amer.Ass.Advanc.Sci., (55):651-67
Photoperiodism in fishes in relation to the annual sexual cycle

Work on Notropis bifrenatus, Phoxinus phoxinus, and Gasterosteus aculeatus critically reviewed, Effectiveness of experimental manipulation of light discussed.

Harrington, R.W., Jr. (1959) 114
Zoologica, N.Y., 44(4):149-68
Effects of four combinations of temperature and daylength on the ovogenetic cycle of a low-latitude fish, Fundulus confluentus Gooden & Bean.

High temperature induced later phases of maturation, but retarded earlier ones; low temperature accelerated earlier phases, but suppressed later ones. Retardation of ovogenesis by high temperature seemed to be strongly reinforced by long days.

Henderson, N.E. (1962) 115
Canad.J.Zool., 40(4):631-41
The annual cycle in the testis of the eastern brook trout, Salvelinus fontinalis (Mitchill)

Six stages recognized. Typical glandular interstitium lacking. A gland-like structure of unknown function discovered in sperm duct.

Hisaw, F.L. (1959) 116
In Comparative endocrinology edited by A. Gorbman. New York, John Wiley & Sons, pp:533-52
Endocrine adaptations of the mammalian estrous cycle and gestation

Conditions among fishes, especially with regard to the corpus luteum, described and discussed.

Hisaw, F.L. (1963) 117
In Physiology of reproduction edited by F.L. Hissaw, Jr., Corvallis, Oregon State Univ. Press, pp:119-38
Endocrines and the evolution of viviparity among the vertebrates

History of the pituitary-gonad axis discussed. Possible role of pituitary in the maintenance of embryos in viviparous and ovoviviparious sharks and bony fishes critically analyzed, including the function of the corpus luteum and its homologs.

Hisaw, F.L., Jr. and F.L. Hisaw (1959) 118
Anat.Rec., 135(4):269-77
Corpora lutea of elasmobranch fishes

The granulosa is transformed into foam cells which ingest yolk and detritus in the ruptured follicles of Hydrolagus, Raja, Squalus, and Mustelus, the first two being egg-layers, the others live-bearers. Endocrine function of luteal bodies thought not to be their original one, but a later adaptation.

Hoar, W.S. (1959) 119
In Comparative endocrinology edited by A. Gorbman. New York, John Wiley & Sons, pp:1-23
Endocrine factors in the ecological adaptation of fishes

Relationship of pituitary hormones and others to migration and habitat selection discussed.

Hoar, W.S. (1962) 120
Anim.Behav., 10(3/4):247-66
Hormones and the reproductive behavior of the male three-spined stickleback (Gasterosteus aculeatus)

Complete expression of nest building, aggressive and associated behavior requires both pituitary (gonadotrophic?) and testicular (sex steriod) hormones.

Hoar, W.S. (1962) 121
Gen.comp.Endocrinol., Suppl.1:206-16
Reproductive behavior of fish

Relation to pituitary and gonadal hormones discussed. Effects of castration and pituitary stimulation (by light) on behavior of Gasterosteus aculeatus described.

Hoar, W.S. (1963) 122
In Physiology of reproduction edited by F.L. Hisaw, Jr., Corvallis, Oregon State Univ. Press, pp:17-35
Hormones and reproductive behavior of the poikilothermous vertebrates

Role of pituitary discussed, with special reference to Gasterosteus aculeatus.

Honma, Y. (1958) 123
J.Fac.Sci.Univ.Niigata (2), 2(5): 189-205
A revision of the pituitary gland found in some Japarese teleosts

Brief description, with simple line drawings, of gland from 26 marine and 4 freshwater species.

Honma, Y. (1959) 124
Bull.Jap.Soc.sci.Fish., 25(10/12): 620-3
(Histo-morphology of some endocrine glands of a cyprinid fish, Gnathopogon elongatus (T. et S.) during its maturation period) In Japanese with English summary

Morphology similar to Tribolodon but different from Carassius and Cyprinus. Cyanophils associated with gonadotrophin production.

Honma, Y. (1959) 125
J.Fac.Sci.Univ.Niigata (2), 2(6): 225-33
Studies on the endocrine glands of a salmonoid fish, ayu, Plecoglossus altivelis Temminck et Schlegel. 1. Seasonal variation in the endocrines of the annual fish

Pituitary and gonads studied. Cyanophils thought to be gonadotrophs.

Honma, Y. (1959) 126
J.Fac.Sci.Univ.Niigata (2), 2(6): 235-42
Studies on the endocrine glands of a salmonoid fish, ayu, Plecoglossus altivelis Temminck et Schlegel. 2. Endocrines of the spent fish or otu-nen ayu

Pituitary seems to return to prespawning condition exhibited by young fish. Ovaries show no new oocytes, indicating that although fish may survive, they will not spawn again.

Honma, Y. (1960) 127
(In Studies on the morphology and the role of the important endocrine glands in some Japanese cyclostomes and fishes, Niigata, Japan. Privately printed, Bunkyo-Do Pub. Co., 139 p.) In Japanese with English summary

Pituitary glands of two cyclostomes, seven elasmobranchs and 49 teleosts described and figured. Function of the gland discussed.

Honma, Y. (1960) 128
Jap.J.Ichthyol., 8(1/2):29-34
(The morphology of the pituitary gland of a sea-lamprey Lampetra (=Entosphenus) japonica (Martens), during its anadromous period) In Japanese with English summary

Cyanophilic cells present in pro-adenohypophysis, which author homologizes with pars distalis of higher vertebrates (tetrapods). Meso-adenohypophysis, which contains acidophilic cells, homologized with pars tuberalis.

Honma, Y. (1960) 129
Annot.zool.jap., 33(4):234-40
Studies on the endocrine glands of the salmonoid fish, ayu, Plecoglossus altivelis Temminck et Schlegel. 3. Changes in the adrenal cortical tissue during the life-span of the fish

During breeding season, fish is in a condition of hyperadrenocorticism. Adrenal hermorrhage seems to be a factor causing death after spawning.

Honma, Y. (1961) 130
Bull.Jap.Soc.sci.Fish., 27(10):873-80
Studies on the endocrine glands of the salmonoid fish, ayu, Plecoglossus altivelis Temminck et Schlegel. 4. The fate of the unspawned eggs and the new crops of oocytes in the spent ovary

In contrast to individuals studied earlier (see 126), young oocytes were found in spent females that had survived spawning. These cells seem to arise from residual oogonia. Corpora lutea from pre- and post-ovulation situations do not appear to secrete hormones.

Honma, Y. and E. Tamura (1962) 131
Jap.J.Ichthyol., 9(1/6):135-52
(Seasonal changes in the gonads of the land-locked salmonoid fish, ko-ayu, Plecoglossus altivelis Temminck et Schlegel) In Japanese with English summary

Development and maturation of gonads described. Not all eggs mature at same time, but germ cells in testes do. Fate of new germ cells in fish that survive spawning not known. Corpora lutea are non-secretory.

Honma, Y. and E. Tamura (1963) 132
Zoologica, N.Y., 48(1):25-32
Studies on the endocrine glands of the salmonoid fish, the ayu, Plecoglossus altivelis Temminck & Schlegel. 5. Seasonal changes in the endocrines of the land-locked form, the koayu

Ontogenetic and seasonal changes in pituitary and gonads described. Certain cyanophils seem to be gonadotrophs (see 131).

Hubbs, C. and K. Strawn (1957) 133
Ecology, 38(4):596-602
The effects of light and temperature on the fecundity of the greenthroat darter, Etheostoma lepidum

Reproductive rate controlled by temperature and condition of fish, not by the duration of intensity of light.

Husain, A. (1945) 134
Proc.nat.Inst.Sci.India, 11(3):320-4
Analysis of experimental data on the spawning of carp in the Punjab

Injections of prolan and antuitrin-S into female Cirrhina mrigala and Labeo rohita (total of 80-120 R.U.) made them easy to strip but the eggs could not be fertilized.

Inoue, T. and C. Kawakami (1959) 135
Okajimas Folia anat.jap., 32(6):341-6
An investigation on the cells of nucl. preopticus in Teleostei

In Anguilla, Cyprinus and Carassius.

Ioff, N.A. (1958) 136
Dokl.Akad.Nauk SSSR, 118(3):621-7
(The effect of temperature on the sexual cycle in Phoxinus phoxinus L.) In Russian

A period of cold followed by a rise in temperature is necessary for ripening of the gonads.

Ioff, N.A. (1958) 136
Dokl.Akad.Nauk SSSR (En Transl.biol. Sci.Sec.), 118(1/6):24-7
The effect of temperature on the sexual cycle in Phoxinus phoxinus L. In English

Ioff, N.A. (1960) 137
Vop.Ikhtiol., (15):118-22
(The stimulation of the sexual cycle in minnows) In Russian

Maintaining Phoxinus phoxinus through winter at about 20°C inhibits sexual maturation.

Irikhimovich, A.I. and M.P. Statova (1958) 138
Dokl.Akad.Nauk SSSR, 122(6):1126-8
(The comparative morphology of the development of the hypophysis in bony fishes) In Russian

Final differentiation of carp pituitary occurs at 33 days. Basophils of transitional lobe responsible for gonadotrophin production.

Irikhimovich, A.I. and M.P. Statova (1958) 138
Dokl.Akad.Nauk SSSR (En Transl.biol. Sci.Sec.), 122(1/6):744-6
The comparative morphology of the development of the hypophysis in bony fishes In English

Irikhimovich, A.I. and A.M. Zelenin 139
Dokl.Akad.Nauk SSSR, 114(3):655-7
(Histological changes occurring in the hypophysis of Cyprinus carpio during sexual maturation) In Russian

Seasonal and age changes in histology of pituitary correlated with state of gonads. Basophils considered to be gonadotrophs. Terminology of parts of pituitary discussed.

Irikhimovich, A.I. and A.M. Zelenin 139
Dokl.Akad.Nauk SSSR (En Transl.biol. Sci.Sec.), 114(1/6):548-51
Histological changes occurring in the hypophysis of Cyprinus carpio during sexual maturation In English

Ishii, S. (1961) 140
J.Fac.Sci.Univ.Tokyo (4),9(2): 279-90
Effects of some hormones on the gestation of the top minnow

Mammalian gonadotrophins or progesterone had no noticeable effect on ovary of gravid Gambusia. Estradiol benzoate induced premature release of young, when the latter were well developed, and sometimes caused the death of early ones. Concurrent injection of prolactin reduced number of deaths. Estrogen inhibited growth of oocytes, and concurrent treatment with frog pituitary reduced this effect.

Iwasawa, H. (1960) 141
J.Fac.Sci.Univ.Niigata (2),4(1): 27-32
The effects of the mammalian hypophysis on the development of the gonad in frog larvae

A goby, Chasmichthys dolichognathus, received 13 injections of mammalian anterior pituitary extract over a period of nearly six weeks with no effect on gonad.

Jasiński, A. (1961) 142
Acta Biol.cracov.Zool., 4(1):79-88
Structure and vascularization of the pituitary body of teleosts. Part 1. The eel (Anguilla anguilla L.)

Gland has own afferent and efferent vessels which do not penetrate brain, only posterior lobe being connected. No hypophysial portal system described.

Jørgensen, C.B. and L.O. Larsen (1960) 143
Ergebn.Biol., 22:1-29
Comparative aspects of hypothalamic-hypophysial relationships

Evolution of pars nervosa and median eminence of higher vertebrates from neurohypophysis of cyclostomes and fishes discussed. This finding does not allow any conclusions on the role of the

the piscine neurohypophysis in reproduction.

Kamer, J.C. van de and A.F. Schreurs (1959) 144
Z.Zellforsch., 49(5):605-30
The pituitary gland of the brook lamprey (Lampetra planeri) before, during and after metamorphosis (a preliminary, qualitative investigation)

Ontogenetic changes described, including histology of gland. A basophilic, PAS-positive cell in the pro-adenohypophysis is probably a gonadotroph.

Kaushik, D.K. and W.T. Helm (1962) 145
Proc.Utah Acad.Sci., 39:92-8
Observations on pituitary hormone injections and ripening of fish

Carassius auratus treated with pituitaries of same species or Cyprinus carpio. Females require more than males. Several small injections more effective than one large. Female glands more effective than male, mature than immature, and before spawning than after spawning.

Kawaziri, M. (1950) 146
Contr.centr.Fish.Sta.Japan, (104) 166-72
(Influence of population density on the reproduction of killifish) In Japanese with English summary

The more dense the population of Oryzias latipes, the lower the number of eggs laid per female. Aquarium water changed frequently.

Kazanskii, B.N. (1957) 147
Proc.Conf.Fish., Moscow, (7):130-8
(Analysis of phenomena taking place in the oocytes of sturgeon subjected to hypophysis injection) In Russian

Detailed account of changes occurring during the final stages of maturation and fertilization.

Kazanskii, B.N. (1957) 148
Uchen.Zap.leningr.Univ.(biol.), (228):33-53
(Rationalization of Kura sturgeon culture on the basis of an analysis of intraspecific biological groups) In Russian

Technique of obtaining eggs by means of sturgeon pituitary injections in Acipenser gueldenstaedti, A. stellatus and A. nudiventris described, both for vernal and hiemal races.

Kazanskii, B.N. (1962) 149
Vop.Ekol., 5:88-9
(Experimental and histophysiological analysis of changes in the sexual cycles of fishes under the influence of ecological factors) In Russian

By selecting definite values of light and temperature, the maturation of Acipenser and Gasterosteus aculeatus was delayed for long periods in the spring and Coregonus in the autumn.

Khan, H.A. (1962) 150
Proc.nat.Acad.Sci.India, 32(2): 101-14
The functional anatomy of the pituitary of a freshwater teleost, Labeo rohita (Ham.)

Histological description. Gonadotrophs not identified.

Khanna, D.V. (1958) 151
Indian J.Fish., 5(2):282-90
Observations on the spawning of the major carps at a fish farm in the Punjab

Oxygen tension, pH and water chemistry not considered important in inducing spawning in nature, but flood waters are necessary.

Kimura, M. (1958) 152
Bull.Jap.Soc.sci.Fish., 23(12): 754-7

(Early development of the mudskipper, Periophthalmus cantonensis (Osbeck)) In Japanese

Eggs obtained from females injected with frog pituitaries were successfully fertilized.

Kirshenblat, Ia.D. (1949) 153
Dokl.Akad.Nauk SSSR, 66(4):745-8
(The action of the hormones of the fish hypophysis on female mammals) In Russian

Acetone-dried pituitaries from Cyprinus carpio brought about enlargement of follicles in infantile mice, hyperemia of the ovaries in infantile rats, and hyperemia and weight increase in ovaries of adult or juvenile rabbits.

Kirshenblat, Ia.D. (1956) 154
Dokl.Akad.Nauk SSSR, 111(2):504-6
(Effect of purified pituitary hormones on fish ovaries) In Russian

Ovulation in normal or hypophysectomized Misgurnus fossilis brought about by mammalian LH, but not by FSH, ACTH or lactogenic hormone.

Kirshenblat, Ia.D. (1959) 155
Biull.eksp.Biol.Med.(En Transl.), 47(4):503-7
Action of cortisone on the ovaries of the loach

Cortisone causes maturation of oocytes without ovulation in Misgurnus fossilis. When injected with subliminal doses of LH, it causes ovulation and oviposition of mature eggs. In vitro, LH does not operate, but cortisone does.

Kirshenblat, Ia.D. (1961) 156
Vop.Ikhtiol., 1(1):166-93
(Physiological mechanisms regulating the processes of oocyte ripening and ovulation in the pond loach Misgurnus fossilis (L.)) In Russian

Frog pituitaries, mammalian anterior lobe extract, HCG and purified LH induced egg-laying, as also did DOCA and methyl testosterone. Blocking nerve impulses to ovaries did not reduce their response to LH.

Kobayasi, H. and I. Yamabayashi (1957) 157
Jap.J.Ichthyol., 6(4/6):170-6
(On the acceleration of spawning in a loach, Misgurnus anguillicaudatus (Cantor) by injection of the hypophyses of the same species) In Japanese with English summary

Implantation of three or four glands resulted in accelerated spawning, but most of the eggs were either immature or produced abnormal offspring.

Koshelev, B.V. (1961) 158
Dokl.Akad.Nauk SSSR, 136(1):214-7
(Seasonal peculiarities in the maturation of the ova in fishes with two types of spawning) In Russian

Histological changes in the ovaries of Perca fluviatilis which spawns but once, and Acerina cernua which spawns in May and later in June or July.

Koshelev, B.V. (1961) 158
Dokl.Akad.Nauk SSSR (En Transl. biol.Sci.Sec.), 136(1/6):36-8
Seasonal peculiarities in the maturation of the ova in fishes with two types of spawning
In English

Koshelev, B.V. (1961) 159
Vop.Ikhtiol., 1(4):716-24
(Changes in the sexual cycles of fishes with a single annual spawning, associated with changes in environmental conditions) In Russian

Seasonal histological changes in the ovaries of Esox lucius, Abramis brama, Rutilus rutilus, Perca fluviatilis and Acerina cernua.

Krishnamoorthi, K.P. (1957) 160
J.zool.Soc.India, 9(2):153-61
A comparative study of protein-

bound amino acids in the ovary and pituitary of Mystus seenghala (Sykes)

Relatively greater number and quantity of amino acids found at maturation, by means of paper chromatography.

Kubota, Z. (1961) 161
J.Shimonoseki Coll.Fish., 11(1): 197-212
Ecology of the Japanese loach, Misgurnus anguillicaudatus (Cantor). 3. Development of the gonad during the maturation

Ontogenetic and seasonal histological study.

Kuronuma, K. (1955) 162
Proc.Indo-Pacif.Fish.Coun., 5, sec. 2/3:126-30
Do Chinese carps spawn in Japanese waters?

Male Ctenopharyngodon idellus can be induced to produce milt by treatment with hormones and such fish have been successfully hybridized with Cyprinus carpio. Young C. idellus and Hypophthalmichthys molitrix have been found in Japanese waters. This is a review.

Kuznetsova, I.I. and V.S. Matiushin (1961) 163
Ryb.Khoz., (6):27-30
(The first year of operation of the Tsimlyansk fish hatchery) In Russian

Ctenopharyngodon idellus and Hypophthalmichthys molitrix brought from China in 1959. They appear to have grown well. No mention of breeding.

Lebkova, N.P. (1956) 164
Dokl.Akad.Nauk SSSR, 109(2):411-2
(Stimulation of the transition into the spawning stage of male and female freshwater lampreys (Lampetra fluviatilis)) In Russian

Pituitaries from Cyprinus carpio injected into one female and two male lampreys, and eggs and milt were produced two months before normal spawning season.

Lederis, K. (1962) 165
Z.Zellforsch., 58(2):192-213
Ultrastructure of the hypothalamo-neurohypophysial system in teleost fishes and isolation of hormone-containing granules from the neurohypophysis of the cod (Gadus morhua)

Electron microscope studies of Gadus morhua, Cottis bubalis and Salmo gairdnerii. Hormone with pressor activity seems similar to that in mammals.

Legait, E. and H. Legait (1958) 166
C.R.Soc.Biol., Paris, 152(1):130-3
Recherches sur l'ultrastructure de l'hypophyse de quelques téléostéens (Studies on the ultrastructure of the hypophysis of certain teleosts)

Neurosecretory fibers intimately contact pituicytes. Colloid formed by cyanophils of meso-adenohypophysis. Salmo trutta and Cyprinus carpio studied.

Legait, E. and H. Legait (1959) 167
C.R.Ass.Anat., 45:519-22
Recherches sur l'ultrastructure de l'adénohypophyse (Studies on the ultrastructure of the adenohypophysis)

Penetration of neurosecretory fibers into gland described, including formation of neuro-glandular synopses. Formation of colloid also discussed.

Legait, H. (1957) 168
C.R.Soc.Biol., Paris, 151(11): 1940-3
Le vascularisation du lobe distal de l'hypophyse des téléostéens comparée à celle des autres vertébrés (The vascularization of the distal lobe of the hypophysis in teleosts compared with that in other vertebrates)

Sharks and rays have pituitary vascularization similar to the

hypothalamo-hypophysial portal system of warmblooded vertebrates, but this is lacking among teleosts. Raja spp., Scyliorhinus spp., Salmo trutta, Barbus barbus, Abramis brama, Cyprinus carpio, Alburnus alburnus, Leuciscus cephalus, Scardinius erythrophthalmus, Gobio gobio, Ictalurus nebulosus, Perca fluviatilis and Gasterosteus aculeatus studied.

Legait, H. and E. Legait (1957) 169
C.R.Soc.Biol., Paris, 151(11):1943-6
Terminaisons neurosécrétoires au niveau de l'adénohypophyse chez quelques téléostéens. Étude au microscope électronique (Neurosecretory endings on a level with the adenohypophysis of certain teleosts. A study with the electron microscope)

Nerve fibers enter pituitary and carry neurosecretory material there. Same species studied as by Legait (No. 168).

Legault, R. (1958) 170
Copeia, 1958(4):328-30
A technique for controlling the time of daily spawning and collecting of eggs of the zebra fish, Brachydanio rerio (Hamilton-Buchanan)

Control of light essential.

Leray, C. (1961) 171
C.R.Acad.Sci., Paris, 252(24):3876-8
Contribution à l'étude de la morphologie hypophysaire chez Lepadogaster gouani Lacépède (Téléostéens, Gobiesocidae) (Contribution to the study of the hypophysial morphology of Lepadogaster gouani Lacépède (teleost, Family Gobiesocidae))

Gland is embedded in brain with stalk region facing the rear. Cellular constituents described.

Leray, C. and N. Carlon (1963) 172
C.R.Soc.Biol., Paris, 157(3):572-5
Sur la présence d'une dualité parmi les cellules cyanophiles de l'adenhypophyse de Mugil cephalus L. (Téléostéen, Mugilidé) (On the presence of a duality among the cyanophilic cells of the hypophysis of Mugil cephalus L.)

Localization of gonadotrophs by staining with thionine paraldehyde-PAS-yellow naphthol. Ontogenetic changes described.

Leray, C., R. Seite and A. Stahl (1961) 173
C.R.Soc.Biol., Paris, 155(6):1341-3
Les rapports de la neurosécrétion préoptique et de l'adénohypophyses chez quelques poissons téléostéens (The reports of preoptic neurosecretion and the adenohypophysis of certain teleost fishes)

Neurosecretion found among cells, including acidophils and cyanophils. Hippocampus guttulatus, Sargus annularis, Morone labrax, Scorpaena scrofa, S. porcus, Mugil cephalus and M. capito studied.

Mammen, T.A. and P. Sulochanan (1962) 174
Proc.Ind.Adad.Sci.(B), 16(1):27-34
Induced breeding of catla in the Mettur reservoir

Success achieved in one case with alcohol-preserved glands from same species, Catla catla. Problem of overdosage discussed.

Manea, Gh. and A. Nicolau (1960) 175
Bul.Inst.Cerc.pisc., 19(1):53-8
Quelques données sur la reproduction artificielle et dirigée de la carpe, effectuée à échelle industrielle dans les lacs danubiens, au printemps 1959 (Some data on artificially directed spawning of the carp, carried out on an industrial scale in Danube lakes in spring, 1959) In Romanian with French summary

Intramuscular injections of carp pituitary employed.

Marshall, A.J. (1960) 176
Symp.zool.Soc.Lond., 1:137-51
Reproduction in male bony fish

Environmental control of reproduction discussed, including effect of light on the phenomenon of "runting". Cellular source of androgens described.

Marzolf, R.C. (1957) 177
J.Wildlife Mgmt, 21(1):22-8
The reproduction of channel catfish in Missouri ponds

Conditions necessary for spawning Ictalurus punctatus systematically determined. One to two years required as an acclimatization period.

Mathur, D.S. (1962) 178
Zool.Polon., 12(2):131-44
Seasonal variations in the ovary and testes of Barbus stigma (Puntius sophore)

Changes are more apparent in males. There is a single spawning season.

Matty, A.J. (1960) 179
Symp.zool.Soc.Lond., 2:1-15
Thyroid cycles in fish

Relationship of thyroid hormones to reproduction discussed, in elasmobranchs as well as bony fishes.

Matty, A.J. (1960) 180
Nature, Lond., 185(4707):180-1
The pituitary of Myxine glutinosa

Gland not degenerate but adenohypophysis is not histologically differentiated. Neurosecretory material and basophils like those in vertebrates present. (See No. 181).

Matty, A.J. (1960) 181
Acta endocr., Copenh., Suppl.51:1007
The most primitive pituitary?

In Myxine glutinosa, the connective tissue septum does not completely separate the gland into two parts, and the posterior end of the infundibulum comes into intimate contact with the adenohypophysis. Two types of PAS-positive basophils, some of them also AF-positive, seen in addition to chromophobes. This is a primitive, not a degenerate organ.

Matty, A.J. and J.M. Matty (1959) 182
Quart.J.micr.Sci., 100(2):257-67
A histochemical investigation of the pituitary glands of some teleost fish

Tests for carbohydrates, amino acids, and lipids applied, and problem of identifying gonadotrophs discussed. Phoxinus phoxinus, Rutilus rutilus, Perca fluviatilis, Bathystoma aurolineatum, Scarus guacamaia and S. croicensis studied.

Mellinger, J. (1960) 183
Bull.Soc.zool.Fr., 85(5/6):395-9
La circulation sanguine dans le complexe hypophysaire de la roussette (The blood circulation of the hypophysial complex of the dogfish)

Both living and dead Scyliorhinus observed. Morphology analyzed in relation to control by the brain.

Mellinger, J. (1960) 184
C.R.Acad.Sci., Paris, 251(21):2422-4
Esquisse structurale de l'appareil hypophysaire d'un sélacien, Scyliorhinus caniculus (L.), pour servir de base à une étude expérimentale des corrélations neuro-endocriniennes (Structural outline of the hypophysial apparatus of a selachian, Scyliorhinus caniculus (L.), to serve as the basis for an experimental study of neuro-endocrine correlations)

Cell types, including gonadotrophs, distinguished. The hypophysial portal system does not influence the entire anterior lobe including the part containing the gonadotrophs.

Mellinger, J. (1962) 185
C.R.Acad.Sci., Paris, 255(15):1789-91
Existence de plusieurs systèmes neurosécrétoires hypothalamo-

hypophysaires chez les poissons élasmobranches Scyliorhinus caniculus et Sc. stellaris. Microscopie ordinaire et microscopie électronique (Existence of several hypothalamo-hypophysial neurosecretory systems in the elasmobranch fishes, Scyliorhinus caniculus and S. stellaris. Ordinary and electron microscopy).

Mellinger, J. (1962) 186
C.R.Acad.Sci., Paris, 255(18):2294-6
Cytologie hypophysaire de Scyliorhinus caniculus (L.) et d'autres poissons élasmobranches. Microscopie optique et microscopie électronique (Hypophysial cytology of Scyliorhinus caniculus (L.) and of other elasmobranch fishes. Optical and electronic microscopy)

Gonadotrophs identified. They stain with analine blue, alcian blue, PAS and AF, and they are located in the ventral lobe. Raja clavata, Torpedo marmoratus and Scyliorhinus stellaris also studied.

Mellinger, J., E. Follenius and A. Porte (1962) 187
C.R.Acad.Sci., Paris, 254(6):1158-9
Présence de terminaisons neurosécrétoires sur les capillaires primaires du système porte hypophysaire de la roussette (Scyliorhinus caniculus). Étude au microscope electronique (Présence of neurosecretory endings on the primary capillaries of the hypophysial portal system of the dogfish (Scyliorhinus caniculus). Study with the electron microscope)

Abundant in median eminence. Arrangement indicates control of pituitary by hypothalamus through neurosecretion.

Meurling, P. (1962) 188
Z.Zellforsch., 58(1):51-69
The relations between neural and intermediate lobes in the pituitary of Squalus acanthias

Two lobes separated by a connective tissue membrane that is absent in few places. The highly specialized intermediate lobe is penetrated only to a slight degree, in contrast to other elasmobranchs such as Scyliorhinus, Mustelus, Raja and Torpedo.

Meyer, F.P. and J.H. Stevenson (1962) 189
Progr.Fish Cult., 24(2):65-7
Studies on the artificial propagation of the paddlefish

Injections of CG unsuccessfully used on Polyodon spathula.

Misra, A.B. and A.G. Sathyanesan (1959) 190
Proc.int.Congr.Zool., 15:999-1000
On the persistence of the oro-hypophysial duct in some clupeiod fishes

In adult Hilsa ilisha, Gadusia chapra and Engraulis telera. A well developed sella turcica is present.

Møller-Christensen, E., A.F. Bruun, and A.M. Hemmingsen (1958) 191
Acta endocr., Copenh., 28(1):103-11
Further attempts to induce maturation of the eggs of the European eel, Anguilla anguilla L., by hormone injections

Injections of CG with a non-steroid, synthetic estrogen (diparaoxyphenylhexane) or a natural estrogen increased the size of ovarian eggs, but did not lead to ripeness.

Morosova, T.E. (1957) 192
Dokl.Akad.Nauk SSSR, 111(6):1129-32
(The significance of external and internal factors in the sexual cycle of the perch (Perca fluviatilis L.)) In Russian

Females kept with and without light, heat, a sandy substratum, or males. Only too low a temperature prevented maturation and spawning.

Morosova, T.E. (1957) 192
Dokl.Akad.Nauk SSSR (En Transl.biol. Sci.Sec.), 112(1/6):50-3

The significance of external and internal factors in the sexual cycle of the perch (Perca fluviatilis L.) In English

Mousset, G. (1957) 193
Bull.Cent.Etud.Rech.sci., Biarritz, 1(4):559-61
Sur la maturation sexuelle du congre (On the sexual maturation of the conger eel)

Injections of CG to maturing female Conger conger resulted in ovulation of ripe eggs. Injections of adrenal cortical extract healed ulcerations.

Mullem, P.J. van (1959) 194
Arch.néerl.Zool., 13(2):147-95
A histo- and cytological study on the pituitary of the stickleback Gasterosteus aculeatus L. forma trachura Cuv. partly based on a new fixation procedure after freeze drying

Evidence for presence of LH and FSH given, but differentiation of cells producing these gonadotrophins as well as TSH not definite.

Nadamitsu, S. (1958) 195
Zool.Mag., Tokyo, 67(5):152-4
(Effects of potassium fluoride on in vitro ovulation in the spinous loach) In Japanese with English summary

Cobitis taenia striata were injected with frog pituitaries and then their ovaries were removed and placed in KF or in Ca-free Ringer's solutions. No ovulation unless ovaries had remained in treated fish at least two hours. Quicker and more frequent ovulation in the KF solution.

Nadamitsu, S. (1961) 196
J.Sci.Hiroshima Univ.(B-1), 20(1/5):17-26
Studies on in vitro ovulation in vertebrates. 3. In vitro ovulation in the fish

Three species of loaches (Family Cobitidae) injected with frog pituitaries, which accelerated ovulation. Fluoride also did so in vivo and in vitro.

Nair, P.V. (1959) 197
Philipp.J.Sci., 87(3):255-276
Seasonal changes in the gonads of Hilsa ilisha Hamilton

Two peaks are exhibited each year: March and August. After the former most eggs become atretic and are absorbed, but eggs are laid during the latter. Males, however, get rid of their sex products twice a year. The so-called corpus luteum is described.

Natale, L. (1960) 198
Atti Soc.pelor., 5(4):423-37
L'ipofisi del genere Engraulis. Nota 2 - Forme: marine, del lago di Ganzirri, del fiume Simeto e del "lago verde" di Oliveri (The hypophysis of the genus Engraulis. Note 2 - Forms from the sea, the lake of Ganzirri, the river Simeto and the "green lake" of Oliveri)

Anatomy of pituitary of various races of Engraulis encrasicholus described.

Nawar, G. (1959) 199
Ann.Mag.nat.Hist., 13 Ser., 2(19):444-8
Observations on the seminal vesicle of the Nile catfish Clarias lazera

Seasonal changes described. Sperm stored in its, in contrast to Heteropneustes, Gillichthys and Periophthalmus.

Nayar, K.K. and M. Menon (1960) 200
J.Anim.Morph.Physiol., Baroda, 7(1):55-9
Neurosecretory cells of the nucleus praeopticus of the brain of the fish, Tilapia mossambica

Fingerlings used.

Nomura, M. (1962) 201
Bull.Jap.Soc.sci.Fish., 28(11): 1070-6
Studies on reproduction of rainbow trout, Salmo gairdnerii, with special reference to egg taking - 3. Acceleration of spawning by control of light.

Okada, Y. (1960) 202
Studies on the freshwater fishes of Japan. Prefectural University of Mie, Japan. 860 p.

Abstracts of papers by Japanese authors dealing with reproductive endocrinology of fishes. Introduction and culture of Ctenopharyngodon idellus, Cyprinus carpio and other pond fishes.

Olivereau, M. (1960) 203
J.Physiol.Path.gén., 52(1):181-2
Hypophyse et activité sexuelle et thyroïdienne chez l'anguille mâle (Hypophysis and sexual and thyroidal activity in the male eel)

Thyrotrophs and gonadotrophs identified, in immature and mature Anguilla anguilla.

Olivereau, M. (1961) 204
C.R.Acad.Sci., Paris, 252(23):3660-2
Maturation sexuelle de l'anguille mâle en eau douce (Sexual maturation of the male eel in fresh water)

Injections of TSH, contaminated with gonadotrophin, produced mature testes and other changes in male Anguilla anguilla.

Olivereau, M. (1961) 205
C.R.Acad.Sci., Paris, 253(3):541-3
Corpuscules de Stannius et reproduction chez l'anguille mâle (Corpuscles of Stannius and reproduction in the male eel)

These structures help Anguilla anguilla to control the osmotic disequilibrium that develops during sexual maturation.

Olivereau, M. (1962) 206
C.R.Acad.Sci., Paris, 255(16):2007-9
Cytologie de l'hypophyse du cyprin (Carassius auratus L.) (Cytology of the hypophysis of the cyprinid (Carassius auratus L.))

Gonadotrophs, which stain with AF and PAS, identified. Part of them stain with alcian blue, indicating two types. The latter reaction does not hold for the salmon or eel.

Olivereau, M. (1962) 207
Biol.méd., Paris, 51(2):172-9
Cytologie adénohypophysaire chez les agnathés, les poissons et les amphibiens (Adenohypophysial cytology in the cyclostomes, fishes and amphibians)

A concise yet comprehensive review, with comments on the location of the gonadotrophs.

Olivereau, M. (1963) 208
Gen.comp.Endocrin., 3(3):312-32
Effets de la radiothyroïdectomie sur l'hypophyse de l'anguille. Discussion sur la pars distalis des téléostéens (Effects of radiothyroidectomy on the hypophysis of the eel. A discussion of the pars distalis of teleosts)

Gonadotrophs located in posterior region of pars distalis in Anguilla anguilla. Problems of terminology and homology of teleost pituitary, as compared with mammalian one, discussed.

Olivereau, M. and M. Herlant (1960) 209
C.R.Soc.Biol., Paris, 154(4):706-9
Etude de l'hypophyse de l'anguille mâle au cours de la reproduction (Study of the hypophysis of the male eel during reproduction)

Histological study of the pituitary of male Anguilla anguilla, some of them brought to ripeness by injections of CG. Gonadotrophs identified.

Olivereau, M. and G.J. Ridgway 210
(1962)
C.R.Acad.Sci., Paris, 254(4):753-5
Cytologie hypophysaire et antigène sérique en relation avec la maturation sexuelle chez Oncorhynchus species (Hypophysial cytology and serum antigenicity in relation to sexual maturation in species of Oncorhynchus)

Ontogenetic histological studies showed that only female Pacific salmon exhibiting well differentiated gonadotrophs possess the antigen associated with sexual maturity, especially the developing eggs. Males and immatures lack this antigen.

Olsson, R. (1958) 211
Nature, Lond., 182(4651):1745

A bucco-hypophysial canal in Elops saurus

Retention of a primitive characteristic in the lady fish, a primitive teleost.

Olsson, R. (1959) 212
Z.Zellforsch., 51(1):97-107
The neurosecretory hypothalamus system and the adenohypophysis of Myxine

Adenohypophysis completely separated from neurohypophysis by connective tissue, but the possibility exists of vascular connection between median eminence and rostral tip of adenohypophysis. Neurosecretory cells forming diffuse "praeoptic" nuclei described. Their connection with pituitary appears to be effected in very primitive manner. Gonadotrophs tentatively identified.

Otsuka, S. (1956) 213
J.Sci.Suzugamine Coll., 3:115-9
Comparative studies on the pituitary hormones in vertebrates. 1. Effects of anterior pituitary extracts obtained from domestic fowls and frogs on the ovulation of gold fish.

Ovulation in Carassius auratus accelerated by injection of fractions chemically isolated.

Otsuka, S. (1956) 214
J.Sci.Suzugamine Coll., 3:121-6
Comparative studies on the pituitary hormones in vertebrates. 2. Effects of pituitary suspensions and 40% ethanol extracts on the ovulation of hypophysectomized Japanese newts

Both suspensions and extracts of glands of Oncorhynchus keta, Inimicus japonicus and Makaira sp. effective, producing ovulation.

Otsuka, S. (1956) 215
J.Sci.Suzugamine Coll., 3:127-8.
Endocr.jap. 3(1):59-60
Comparative studies on the pituitary hormones of vertebrates. 3. Effects of the pituitary hormones of the tunny, Makaira marlina on the gonads of immature mice

Injections of acetone-dried gland increased weight of ovaries, uteri, testes and seminal vesicles.

Otsuka, S. (1956) 216
Endocr.jap., 3(3):181-5
Comparative studies on the pituitary hormones of vertebrates. 4. Effects of crude LH and FSH on the ovulation of hypophysectomized newts

Chemically separated fractions of glands of Oncorhynchus keta produced ovulation in hypophysectomized Triturus pyrrhogaster.

Otsuka, S. (1956) 217
J.Sci.Suzugamine Coll., 3:129-33
Comparative studies on the pituitary hormones in vertebrates. 5. Effects of anterior pituitary suspensions and extracts of various vertebrates on the gonads of immature mice

Whole dried glands or chemical extracts of them, from Oncorhynchus keta, increased the weight of the ovaries and uteri of immature mice.

Otsuka, S. (1956) 218
Endocr.jap., 3(4):272-9
On the extraction and bioassay of follicle stimulating and luteinizing substances of the salmon

Incomplete separation achieved, but results differ from those with mammalian glands.

Otsuka, S. (1957) 219
J.Sci.Suzugamine Coll., 3(B):17-24
Comparative studies on the pituitary hormones in vertebrates. 7. Amino acids and crystals contained in the pituitary gonadotropic substances of various vertebrates

Amino acids in salmon pituitaries (presumably Oncorhynchus keta) compared with those found in beef and fowl.

Otsuka, S. (1957) 220
J.Sci.Suzugamine Coll., 3(B):25-30
Comparative studies on the pituitary hormones in vertebrates.

8. Paper electrophoresis of the pituitary gonadotropic substances of various vertebrates

Gonadotropic hormones of salmon (presumably Oncorhynchus keta) compared with those of beef, fowl and a frog by means of paper electrophoresis.

Oven, L.S. (1961) 221
Trud.karadag.biol.Stants., (17): 17-23
(Oogenesis and the annual cyclic changes in the ovaries of Mullus barbatus ponticus Essipov) In Russian or Ukrainian

Spawning season is extended, lasting from the beginning of June to the end of August or beyond. The daily spawning exhibited by this goatfish when raised in aquaria is therefore not the result of captive conditions.

Oztan, N. (1960) 222
Istanbul Univ.Fen Fak.Mecm.(Sér.B), 25(1/2):27-47
The effects of gonadotropic and steroid hormones on the gonads of sterile hybrid fishes

Sterile backcross hybrids, produced by mating male hybrids (Xiphophorus hellerii female X X. maculatus male) with female X. hellerii, became fertile after treatment with PMS or methyl testosterone. Histological details of gonads presented.

Oztan, N. (1961) 223
Istanbul Univ.Fen Fak.Mecm.(Sér.B), 26(1/2):21-35
Adenohypophysial basophiles and I^{131} utilization in thyroidal tumor bearing platyfish (Xiphophorus maculatus)

Histology of pituitary described, including gonadotrophs.

Oztan, N. (1963) 224
Gen.comp.Endocrin., 3(1):1-14
The hypothalamic neurosecretory system of a poeciliid fish, Platypoecilus maculatus and its sterile hybrid backcross with Xiphophorus hellerii

In sterile fish, preoptic nuclei appear active, while nuclei lateralis tuberis appear inactive. (Xiphophorus maculatus = Platypoecilus maculatus)

Oztan, N. (1963) 225
Proc.int.Congr.Zool., 16(2):150
Relationship between the hypothalamic neurosecretory system and certain adenohypophysial basophils of platyfish

Sterile backcross hybrids, Xiphophorus hellerii X X. maculatus exhibit few, as well as abnormal cyanophils (basophils) presumed to be gonadotrophs. They also show cells of the nuclei lateralis tuberis that appear inactive, while those of the preoptic pars magnocellularis are highly active.

Oztan, N. and A. Gorbman (1960) 226
J.Morph., 106(3):243-61
The hypophysis and hypothalamo-hypophysial neurosecretory system of larval lampreys and their responses to light

Histological and cytological study of gland and brain of ammocoete larvae of Petromyzon marinus and Lampetra lamottei and of metamorphosing individuals of the latter. Two hypothalamic neurosecretory centers present. Cells in the pituitary described.

Palay, S.L. (1960) 227
Anat.Rec., 138(4):417-43
The fine structure of secretory neurons in the preoptic nucleus of the goldfish (Carassius auratus)

Electron microscope study. Formation of material within the neuron described and discussed.

Panikkar, N.K. (1959) 228
Curr.Sci., 28(2):53-4
Indian fisheries

Problem of obtaining sufficient fry of the major carps for rearing

in ponds discussed. Use of pituitary hormone to solve this problem mentioned.

Parhon, C.I., M. Pitis, and M. Dancasiu (1959) 229
C.R.Ass.Anat., 45(104):624-6
Les variations saisonniéres des glandes endocrines chez les poissons (The seasonal variations in the endocrine glands of fishes)

In Cyprinus carpio, proportion of basophils drops from 70-80% in spring to less than 50% in autumn. In "Salmo trutta irideus" (probably Salmo gairdnerii), basophils are more numerous in autumn.

Persov, G.M. (1957) 230
Uchen.Zap.leningr.Univ.(biol.), (228):72-86
(Methods of work with breeder sterlets) In Russian

Techniques of pituitary treatment of Acipenser ruthenus described and details of results given. Natural occurrence and artificial production of hybrids, A. ruthenus X A. gueldenstaedti reported. Several sperm may take part in the insemination process, and technique of artificially fertilizing eggs more than once is discussed and evaluated.

Pickford, G.E. (1959) 231
In Comparative endocrinology, edited by A. Gorbman. New York, John Wiley & Sons, pp. 404-20.
The nature and physiology of the pituitary hormones of fishes

Presence and functions of LH, FSH and prolactin discussed. Role of neurohypophysial hormone or hormones in reproductive behavior of Fundulus heteroclitus described.

Pillay, T.V.R. (1958) 232
Indian J.Fish., 5(2):201-57
Biology of the hilsa, Hilsa ilisha (Hamilton) of the river Hooghly

Mature fish ascend river to spawn during two distinct seasons, each individual spawning several times during a season. Collecting fish and rearing them in captivity are difficult but not impossible. Turbid water appears essential.

Plügge, H. (1956) 233
Dtsch.Fisch.-Ztg, 3(9):263-5
Karpfenbruterzeugung - sicheres Ablaichen von Karpfen nach Hypophyseninjektion (Production of carp fry - successful spawning of carp following pituitary injection)

Experiments of U. Lieder described. Positive results obtained with the injection of two or three glands from Abramis brama into male or female Cyprinus carpio and Carassius carassius. Influence of temperature discussed.

Polder, J.J.W. (1961) 234
Arch.néerl.Zool., 14(1):45-60
Cyclical changes in testis and ovary related to maturity stages in the North Sea herring, Clupea harengus L.

Seasonal study of morphology and histology of the gonads, which indicates that herring spawn but once a year and that different spawning groups cannot be distinguished by their relative states of maturity.

Polenov, A.L. (1957) 235
Dokl.Akad.Nauk SSSR, 112(6):1122-5
(On the content and distribution of nucleic acids in the neurosecretory cells of the diencephalon of bony fish) In Russian

Distribution of DNA and RNA in nucleus lateralis tuberis and nucleus preopticus of Cyprinus carpio and Abramis brama. Cytology of cells also described.

Polenov, A.L. (1957) 235
Dokl.Akad.Nauk SSSR (En Transl. biol.Sci.Sec.), 112(1/6):108-12
On the content and distribution of nucleic acids in the neurosecretory cells of the diencephalon of bony fish In English

Polenov, A.L. (1960) 236
Dokl.Akad.Nauk SSSR, 129(6):1413-6
(The preoptic hypophysial gomori-positive neurosecretory system of the sazan and carp) In Russian

Seasonal changes in preoptic nucleus described. Frequency and structure of nerve endings differ from sturgeon.

Polenov, A.L. (1960) 236
Dokl.Akad.Nauk SSSR (En Transl.biol. Sci.Sec.), 129(1/6):1029-33
The praeoptic hypophysial gomori-positive neurosecretory system of the sazan and carp In English

Polenov, A.L. and I.A. Barannikova (1958) 237
Dokl.Akad.Nauk SSSR, 123(6):1117-20
(The preopticohypophysial neuro-secretory system in sturgeon) In Russian

Preoptic nuclei, nerve fibers, Herring bodies and other structures described in Acipenser gueldenstaedti, A. stellatus and Huso huso. Seasonal changes briefly mentioned.

Polenov, A.L. and I.A. Barannikova (1958) 237
Dokl.Akad.Nauk SSSR (En Transl. biol.Sci.Sec.), 123(1/6):938-42
The preopticohypophysial neuro-secretory system in sturgeon
In English

Prowse, G.A. (1962) 238
Rep.trop.Fish Cult.Res.Inst. Malacca, 1960-61:13-6
The spawning grass carp

Flowing water appears to be important factor in natural spawning of Ctenopharyngodon idellus, and it ripened captive males. No definite success achieved with injections of pituitary extracts from Puntius javanicus, or CG, or ACTH.

Quasim, S.Z. and A. Qayyum (1961) 239
Indian J.Fish., 8(1):24-43
Spawning frequencies and breeding seasons of some freshwater fishes with special reference to those occurring in the plains of northern India

Three types described: with short, 2-4 month season, with succession of spawnings extending over 4-5 months, and without a definite spawning season. Cirrhina, Barbus, Labeo, Chela, Ophicephalus, Mugil, Rynchobdella, and six genera of catfishes studied.

Ramaswami, L.S. (1962) 240
Gen.comp.Endocrinol., Suppl.1: 286-99
Endocrinology of reproduction in fish and frog

Role of pituitary hormones in development and seasonal changes in gonads of Heteropneustes fossilis described, and hormones from other glands as well. Histochemical studies on presence of LH and FSH also described.

Ramaswami, L.S. and A.B. Lakshman (1958) 241
Nature, Lond., 182(4628):122-3
Spawning catfish with mammalian hormones

Heteropneustes fossilis females were primed with small dose of homoplastic pituitary substance and then given other hormones. Methyl testosterone, estrodiol dipropionate, progesterone, TSH and growth hormone acted synergistically, while oxytocin, PMS and ACTH did not. When administered alone, methyl testosterone, DOCA, ACTH, growth hormone and oxytocin were ineffective.

Ramaswami, L.S. and A.B. Lakshman (1959) 242
J.sci.industr.Res.(C), 18(10): 185-91
Action of mammalian hormones on the spawning of catfish

LH, FSH (contaminated with LH), CG, DOCA, and TSH (contaminated with LH) brought about ovulation in Heteropneustes fossilis, while prolactin, methyl testosterone, estradiol dipropionate,

progesterone, cortisone acetate, growth hormone, thyroxine and insulin did so only if the fish had been primed with a not quite effective dose of its own kind of pituitaries. LH, FSH, estradiol dipropionate, methyl testosterone, cortisone acetate, thyroxine and insulin were effective on primed female Clarias sp. PMS, ACTH and oxytocin were ineffective.

Ramaswami, L.S. and A.B. Lakshman (1959) 243
Proc.nat.Inst.Sci.India (B), 25(2):68-79
The skipper-frog as a suitable embryological animal and an account of the action of mammalian hormones on spawning the same

Pituitary glands of skipper frog, Rana cyanophlyctis, cause female Heteropeneustes fossilis to ovulate and vice versa.

Ramaswami, L.S. and A.B. Lakshman (1961) 244
Proc.nat.Inst.Sci.India (B), 26(Suppl.):30-9
Bioassay studies of the catfish and skipper-frog pituitary glands after treatment with some glycoprotein solvents

Glands of Heteropeneustes fossilis lose their potency to induce ovulation in females of the same species when immersed in trichloroacetic acid, but with shorter periods both glands and surrounding acid were potent. Half-saturated ammonium sulfate does not extract or denature the gonadotrophins, but 50% pyridine does.

Ramaswami, L.S. and B.I. Sundararaj (1957) 245
Acta anat., 31(4):551-62
Inducing spawning in the Indian catfish Heteropneustes with pituitary injections

Glands of same species and of Mystus vittatus and two species of Rana were effective. Glands of Ophicephalus punctatus were not effective. Pituitaries of female Heteropneustes more potent than male, but they vary with season, being less potent after spawning.

Ramaswami, L.S. and B.I. Sundararaj (1957) 246
Naturwissenschaften, 44(2):46
Some aspects of induced spawning in the catfish Heteropneustes

With large doses of its own kind of pituitary substance or of CG, viable eggs can be obtained ten weeks before the spawning season. Viable eggs were obtained three times from the same females within four months.

Ramaswami, L.S. and B.I. Sundararaj (1957) 247
Naturwissenschaften, 44(13):384
Induced spawning in the catfish Clarias

Female Clarias batrachus requires larger doses and more of them than does Heteropneustes fossilis. Glands from same species or Rana tigrina effective, as also is CG. PMS ineffective.

Ramaswami, L.S. and B.I. Sundararaj (1957) 248
Acta anat., 32(3):230-39
Induced spawning in the catfish Heteropneustes with mammalian chorionic gonadotrophins

Injections of CG induced ovulation, but PMS, progesterone, stilbestrol and hexoestrol were not effective. Overdosage discussed.

Ramaswami, L.S. and B.I. Sundararaj 249
Acta endocr., 27(2):253-6
Action of enzymes on the gonadotrophic activity of pituitary extracts of the Indian catfish Heteropneustes

Homogenized glands were treated with ptyalin, trypsin or pepsin. Only the second two destroyed the gonadotrophic potency of the brei. (Ptyalin is supposed to destroy FSH). Authors conclude effective agent is LH-like.

Reinboth, R. and N. Simon (1963) 250
Verh.dtsch.zool.Ges. (Zool.Anz. Suppl. 26):159-68
Die Wirkung von Hypophysen-Hemogenaten auf die Gonadenreifung bei Teleostiern (The effect of hypophysis homogenates on the maturation of teleosts)

Gonads of male and female Lepomis megalotis stimulated by injections of alcohol-preserved pituitaries from Spicara maena. Unsuccessful attempts made to stimulate Rutilus rutilus males and females, young Sparus auratus, and the hermaphroditic species Serranus cabrilla.

Richter, W. (1957) 251
Allg.Fisch.Ztg, 82(12):234-5
Die künstliche Vermehrung der Scherge (Acipenser stellatus) in Kuban (The artificial reproduction of sturgeon (Acipenser stellatus) in the Kuban river)

Russian method of treating sturgeon with pituitaries is described, including artificial fertilization and incubation of eggs obtained in this way.

Riggs, C.D. and K.E. Sneed (1959) 252
Trans.Amer.Fish.Soc., 88(1):53-7
The effects of controlled spawning and genetic selection on the fish culture of the future

Critical historical survey, including use of pituitaries and hormones to induce ripening in captive fishes.

Robertson, O.H. (1958) 253
Fish.Bull., U.S., 58(127):5-30
Accelerated development of testis after unilateral gonadectomy, with observations of the normal testis of rainbow trout

Great increase in remaining testis occurred only in trout more than 13 months old; when pituitaries were implanted into such young fish, the testis increased greatly in size. Laparotomy also has a stimulating effect on testis growth in Salmo gairdnerii.

Robertson, O.H. (1961) 254
Proc.nat.Acad.Sci., Wash., 47(4): 609-21
Prolongation of the life span of kokanee salmon (Oncorhynchus nerka kennerlyi) by castration before beginning of gonad development

Castrated fish lived more than eight years, while controls all died before the end of their fifth year. Castration after sexual maturity prolonged life very little.

Robertson, O.H., S. Hane, B.C. Wexler, and A.P. Rinfret (1963) 255
Gen.comp.Endocrin., 3(4):423-36
The effect of hydrocortisone on immature rainbow trout (Salmo gairdnerii)

Death caused, with histological changes similar to those found in spawning salmon (Oncorhynchus). Prolonged starvation brought about similar changes in some trout.

Robertson, O.H., M.A. Krupp, C.B. Favour, S. Hane, and S.F. Thomas (1961) 256
Endocrinology, 68(5):733-46
Physiological changes occurring in the blood of the Pacific salmon (Oncorhynchus tshawytscha) accompanying sexual maturation and spawning

Concentration of 17-hydroxycorticosteroids greatly increased, with other changes not unlike those exhibited by human beings with Cushing's syndrome.

Robertson, O.H., M.A. Krupp, S.F. Thomas, C.B. Favour, S. Hane, and B.C. Wexler (1961) 257
Gen.comp.Endocrin., 1(5/6):473-84
Hyperadrenocorticism in spawning migratory and nonmigratory rainbow trout (Salmo gairdnerii); comparison with Pacific salmon (Genus Oncorhynchus)

Nonmigratory form, which suffers much less mortality than others, exhibits adrenal hyperplasia like them, but without marked degenerative changes in internal organs. Influence of feeding discussed.

Robertson, O.H. and A.P. Rinfret (1957) 258
Endocrinology, 60(4):559-62
Maturation of the infantile testes in rainbow trout (Salmo gairdnerii) produced by salmon pituitary gonadotrophins administered in cholesterol pellets

Lyophilized pituitaries of Oncorhynchus keta and O. tshawytscha injected as pellets. Full sexual maturity produced in males, even under conditions of starvation.

Robertson, O.H. and Wexler (1960) 259
Endocrinology, 66(2):222-39
Histological changes in the organs and tissues of migrating and spawning Pacific salmon (Genus Oncorhynchus)

Including the pituitary. Commence several months before maturity and resemble effects of hyperadrenocorticism (Cushing's syndrome).

Robertson, O.H. and B.C. Wexler (1962) 260
J.Morph., 110(2):157-85
Histological changes in the pituitary gland of the rainbow trout (Salmo gairdnerii) accompanying sexual maturation and spawning. Histological changes in the pituitary gland of the Pacific salmon (Genus Oncorhynchus) accompanying sexual maturation and spawning Basophils eventually predominate as maturation occurs. Degenerative changes in gland commence before maturity.

Robertson, O.H. and B.C. Wexler 261
(1962)
Gen.comp.Endocrin., 2(5):458-72
Histological changes in the organs and tissues of senile castrated kokanee salmon (Oncorhynchus nerka kennerlyi)

Changes in pituitary similar to those in spawning Oncorhynchus, including the many degenerative ones. (See No. 254).

Roy, B.B. (1962) 262
Proc.nat.Inst.Sci.India (B), 28(1):13-28
Action of zinc on the hypothalmo-pituitary-adrenal axis of the fish, guinea pig and dog and on different experimental preparations

Seasonal changes in pituitary of Catla catla, Cirrhina mrigala and Labeo rohita described; In neurohypophysis, seasonal changes in material from preoptic nuclei noted.

Ruen-Sheng Du (1960) 263
Sci.News Lett., Wash., 78(24):379-92
Reprinted from Sci.sinica, 8(11)
Great progress made in the natural sciences in China during the last decade. (In Chinese)

Hypophthalmichthys molitrix and Aristichthys nobilis have been spawned successfully in ponds by a combination of hormone treatment and environmental manipulation, but no details are given.

Saha, K.C., D.P. Sen, A.K. Roy Chowdhury, and S.K. Chakravarty 264
(1958)
Indian J.Fish., 4(2):284-94
Studies on the factors influencing spawning of Indian major carps in "Bundh" fisheries

Environmental conditions under which Labeo rohita, Catla catla and Cirrhina mrigala spawned were analyzed. Almost neutral water with low alkalinity (measured as $CaCO_3$) is favorable, as also seem to be cloudy days with thunderstorms. No influence of temperature or oxygen content could be found.

Saksena, V.P. (1962) 265
Copei, 1962(3):539-44
The post-hatching stages of the red shiner, Notropis lutrensis

Injections of acetone-dried carp (Cyprinus carpio) pituitary successfully used on females.

Sano, Y. and M. Kawamoto (1960) 266
Z.Zellforsch., 51(2):152-6
Histologische Untersuchungen endozellulären Kapillaren

neurosekretorischer Zellen (Histological investigations of the endocellular capillaries of neurosecretory cells)

In Ophicephalus argus, neurosecretory cells of spinal cord are intimately associated with a capillary net, and some capillaries penetrate the nerve cells, making contact with the nuclear membrane.

Sargeant, D.E. (1956) 267
Abstr.Diss.Univ.Camb., 1953-54:43-5
The effects and mode of action of external factors regulating reproductive cycles and spawning in teleost fish

Sathyanesan, A.G. (1957) 268
Nature, Lond., 180(4576):98-9
Parasitism in relation to the pituitary of Ophicephalus punctatus and Barbus stigma

Trematode parasite found close to gland in snakehead, and myxosporidians infested glands of two barbs. No apparent effect on gonads.

Sathyanesan, A.G. (1958) 269
Indian J.vet.Sci., 28(1):13-20
Studies on the morphology and seasonal histological changes in the pituitary gland of the freshwater teleost Cirrhina reba (Hamilton)

Most prominent are changes in basophils of Übergangsteil (meso-adenohypophysis).

Sathyanesan, A.G. (1959) 270
Naturwissenschaften, 46(5):176
Extravasation of blood-cells in and around the pituitary of the teleost Chela bacaila (Ham.)

Breakdown in blood supply had no apparent ill effects on fish.

Sathyanesan, A.G. (1959) 271
J.zool.Soc.India, 11(1):52-9
Seasonal histological changes in the testis of the catfish Mystus seenghala (Sykes)

Sathyanesan, A.G. (1960) 272
J.zool.Soc.India, 12(2):175-90
Correlative cyclical changes in the pituitary and gonads of Mystus seenghala (Sykes) and Barbus stigma (Cuv. & Val.)

Annual changes, including chromophobe-basophil-acidophil ratios, described.

Sathyanesan, A.G. (1960) 273
Sci.& Cult., 25(12):693-4
The occurrence of the hypophysial cavity in the pituitary of the teleost, Pangasius pangasius (Hamilton)

Scattered cavities found in the anterior part of the gland, a condition similar to the occurring in the trout and eel.

Sathyanesan, A.G. (1961) 274
Sci.& Cult., 27(1):46-7
Occasional occurrence of neurosecretory cells in the pituitary of teleost

Neurosecretory cells were found in the stalk and pars nervosa of the gland of Mystus seenghala. Believed to have migrated there from hypothalamus.

Sathyanesan, A.G. (1961) 275
Proc.zool.Soc.Bengal, 14(1):15-25
Spawning periodicities as revealed by the seasonal histological changes of the gonads in Barbus stigma (Cuv. and Val.)

Annual changes, including description and discussion of atretic oocytes.

Sathyanesan, A.G. (1962) 276
Sci.& Cult., 28(9):432-3
On the basophilic tumour in the pituitary of the freshwater teleost Mystus seenghala (Sykes)

Located among cells of meso-adeno-hypophysis. Basophils may be associated with tumour. Fish had normal testes and appeared normal.

Sathyanesan, A.G. (1962) 277
Proc.nat.Inst.Sci.India (B), 28(6): 497-506
The ovarian cycle in the catfish Mystus seenghala (Sykes)

Spawns once a year, and increase in water temperature seems to be important environmental factor. Corpora lutea present, but no evidence for hormonal function present.

Sathyanesan, A.G. (1963) 278
Cellule, 63(2):281-90
Histological changes in the pituitary and their correlation with the gonadal cycle in some teleosts

Cyanophils in meso-adenohypophysis show marked increase in secretory activity during prespawning and spawning seasons. Hilsa ilisha, Barbus stigma, Heteropneustes fossilis and Mystus seenghala studied.

Sathyanesan, A.G. (1963) 279
Anat.Rec., 146(2):109-15
On the structural peculiarities of the pituitary in some clupeoid fishes with a note on their probable evolutionary significance

An orohypophysial duct and hypophysial cavity in the form of tube-like ramifications are chondrostean features lacking in the higher teleosts. They are present in varying degrees in Elops saurus, Hilsa ilisha, Chanos chanos, Engraulis telara and Gadusia chapra. The evolution of pituitary morphology is discussed.

Sawyer, W.H. and G.E. Pickford 280
(1963)
Gen.comp.Endocrin., 3(4):439-45
Neurohypophysial principles of Fundulus heteroclitus: characteristics and seasonal changes

Arginine vasotocin and 4-serine, 8-isoleucine oxytocin are the two neurohypophysial hormones in this species as in other teleosts. In the spawning season, the latter is undetectable in females, but present in males and in both sexes at other times. This suggests that the oxytocin-like hormone of teleosts may participate in reproduction.

Schiebler, T.H. and J. Hartmann 281
(1963)
Z.Zellforsch., 60(1):89-146
Histologische und histochemische Untersuchungen am neurosekretorischen Zwischenhirn-hypophysensystem von Teleostiern unter normalen und experimentellen Bedingungen (Histological and histochemical investigations on the neurosecretory diencephalon-hypophysis system of teleosts under normal and experimental conditions)

Experimental conditions concern osmoregulation. Species studied: Salmo, Anguilla, Cyprinus, Tinca, Misgurnus.

Scott, D.P. (1962) 282
J.Fish.Res.Bd Can., 19(4):715-31
Effect of food quantity on fecundity of rainbow trout, Salmo gairdnerii

Amount of follicular atresia correlated with extent of starvation, but there is little relationship between egg size and size of fish.

Variation in number of eggs is associated with size of fish, size of egg and adequacy of diet.

Seguin, L.R. (1957) 283
Trans.Amer.Fish.Soc., 86:136-43
Scientific fish culture in Quebec since 1945

Salvelinus fontinalis kept in dark hatchery spawned two months later than usual. High temperatures accelerated maturation nearly one year. Shading improved growth and survival of S. namaycush. Other temperature-light effects on reproduction recorded. Dietary requirements and hybridization also discussed.

Semenov, K.I. (1963) 284
Vop.Ikhtiol., 3(1):99-112
(Biological differences in the quality of sturgeon eggs and their effect on larval development under development under artificial conditions) In Russian

In Acipenser gueldenstaedti that were treated with pituitaries, the eggs that are ovulated first (from posterior part of ovary) tend to be over-ripe, while those ovulated last (from anterior part) tend to be under-ripe. Best survival obtained from young hatched out of eggs ovulated in between. Within these limits larvae from larger eggs are larger and more viable.

Shehadeh, Z.H. (1960) 285
Thesis, M.S., Univ.Michigan
The use of gonadotropins in forced spawning of fishes

A review with comments on dosage and the standardization of piscine hormone preparations.

Shirai, K. (1962) 286
Bull.Fac.Fish.Hokkaido, 13(3):137-51
Correlation between the growth of the ovipositor and ovarian conditions in the bitterling, Rhodeus ocellatus

Ovarian maturity is related to ovipositor growth, but presence of corpora lutea is not. High temperature and lack of mussels inhibit ovarian maturation.

Shiraishi, Y. and T. Takeda (1961) 287
Bull.Freshw.Fish.Res.Lab., Tokyo, 11(1):69-81
(The influence of photoperiodicity on the maturation of ayu-fish, Plecoglossus altivelis) In Japanese with English summary

Short days accelerated sexual maturation, long days delayed it.

Singh, T.P. and A.G. Sathyanesan 288
(1962)
Proc.zool.Soc.Bengal, 15(2):171-83
A comparative study of the pituitary of some freshwater fishes with special reference to their histology

Species studied: Mystus vittatus, Callichrous pabda, Xenentodon cancila, Tricogaster fasciatus and Rhynchobdella aculeata. Nerve ganglion cells found in pars nervosa of Mystus and meso-adenohypophysis of Rhynchobdella.

Slack, H.D. (1960) 289
Rep.trop.Fish Cult.Res.Inst.Malacca, 1957-1959:7-8
Chinese grass carp (Ctenopharyngodon idellus)

Although some fish reached maturity, it was impossible to express egg or sperm by hand. Injection of pituitaries of Tilapia mossambica failed to accelerate the sexual development of either sex. Instead there seemed to be a detrimental stress or shock reaction.

Sneed, K.E. and H.P. Clemens (1959) 290
Progr.Fish Cult., 21(3):117-20
The use of human chorionic gonadotrophin to spawn warm-water fishes

CG used successfully on female Carassius auratus, Pomoxis annularis and Ictalurus punctatus.

Sneed, K.E. and H.P. Clemens (1960) 291
Spec.sci.Rep.U.S.Fish Wildl.Serv.-Fish., (329):12 p.
Use of fish pituitaries to induce spawning in channel catfish

Acetone-dried glands from Lepisosteus spp., Ictiobus spp., Cyprinus carpio, Pylodictis olivaris, and the channel catfish, Ictalurus punctatus, used successfully. Penicillin-G injected simultaneously to eliminate infections.

Sneed, K.E. and H.P. Clemens (1960) 292
Progr.Fish Cult., 22(3):109-13
Hormone spawning of warm-water fishes: its practical and biological significance

Specificity of gonadotrophins discussed and its importance to fish cultural efforts, present and future, assessed.

Sneed, K.E. and H.K. Dupree (1961) 293
Progr.Fish Cult., 23(4):179-82
The effect of thyroid-stimulating hormone combined with gonadotrophic hormones on the ovulation of goldfish and green sunfish

Female Carassius auratus and Lepomis cyanellus were injected with sub-threshold levels of Ictiobus pituitary substance, or CG, plus TSH, and ovulation occurred. The latter species had proved very difficult to spawn artificially with gonadotrophin (alone) injections.

Snow, J.R. (1959) 294
Progr.Fish Cult., 21(2):75-80
Notes on the propagation of the flathead catfish, Pylodictis olivaris Rafinesque

Unsuccessful attempt to spawn fish by giving a series of injections of pituitary substance from Ictalurus punctatus and I. nebulosus to females.

Sokol, H.W. (1961) 295
J.Morph., 109(2):219-35
Cytological changes in the teleost pituitary gland associated with the reproductive cycle

Seasonal changes in Fundulus heteroclitus and those associated with gestation in Poecilia (Lebistes) reticulata described. Identification of gonadotrophs discussed.

Sorokin, V.P. (1961) 296
Rapp.Cons.Explor.Mer, 150:245-50
The redfish: gametogenesis and migrations of the Sebastes marinus (L.) and Sebastes mentella Travin

Copulation occurs in late summer, but fertilization does not occur until about March, milt remaining in ovary at rest.

Stahl, A. (1957) 297
Acta anat., 31(Suppl.28):158 p.
Recherches sur les élaborations cellulaires et la neurosécrétion dans l'encéphale des poissons téléostéens (Studies on the cellular productions and neurosecretion in the brain of teleost fishes)

Neurosecretory centers and tracts described in detail in Gadus capelanus, Onos tricirratus and Morone labrax.

Stahl, A. (1958) 298
C.R.Ass.Anat., 44(100):699-708
Neurosécrétion et autres élaborations neuronales dans l'encéphale des poissons téléostéens (Neurosecretion and other neuronal elaborations in the brain of teleost fishes)

Two basic processes are distinguished: a glandular and hormonal neurosecretion in the n.l.t. and n.p. and a common substance elaborated specifically by the neurone during its metabolism. Gadus capelanus, Onos tricirratus, Morone labrax, Mugil cephalus, M. capito and M. auratus studied.

Stahl, A. and G. Leray (1962) 299
Mem.Soc.Endocrin., (12):149-63
The relationship between diencephalic neurosecretion and the adenohypophysis in teleost fishes

Nucleus tuberalis exhibits a different type of neurosecretion from that of nucleus preopticus. It undergoes a seasonal cycle correlated with changes in the gonadotrophs. Development of gonads probably regulated by this neurosecretion, which may reach pituitary through ependymal cells of recessus infundibuli. Mugil spp. and Gadus capelanus studied.

Stahl, A., R. Seite and C. Leray (1960) 300
C.R.Soc.Biol., Paris, 154(7):145-8
Cytologie adénohypophysaire en fonction du cycle sexuel chez les poissons. L'hypophyse des mugilidés (Adenohypophysial cytology in the functioning of the sexual cycle of fishes. The hypophysis of mullets)

In Mugil cephalus, M. capito and M. auratus, pituitary cyanophils multiply and become vacuolized during maturation, and they probably secrete gonadotrophins.

Statova, M.P. (1959) 301
Izv.moldav.Fil.Akad.Nauk SSSR,

7(61):77-93
(Gonadal and hypophysial changes in the female zander of the Dubossavskii reservoir during the attainment of sexual maturity) In Russian with English summary

Appearance of basophils in pituitary is correlated with changes in ovary, in Lucioperca lucioperca.

Stefan, G. (1957) 302
Bul.Inst.Cerc.pisc., 16(2):46-52
Reproducerea artificiala a cleanului si mrenei la Manastur, Cluj
(Artificial propagation of Leuciscus cephalus (L.) and Barbus barbus (L.) at Manastur, Cluj)

Successful pituitary treatment of Leuciscus, unsuccessful with Barbus.

Steffens, W. (1956) 303
Dtsch.Fisch.-Ztg, 3(2):59-61
Laichreife Äschen durch Hypophysen-injektionen (Ripe European grayling by means of pituitary injections)

Male and female Thymallus thymallus received intramuscular injection of two to four acetone-preserved pituitaries from Cyprinus carpio and Esox lucius. Most of the females and some of the males became ripe two to eleven days later.

Steffens, W. (1957) 304
Dtsch.Fisch.-Ztg, 4(3):83-7
Die Wirkung von Hypophyseninjektionen auf Laichkarpfen (The effect of pituitary injections on spawning carp)

Male and female Cyprinus carpio given intramuscular injections of acetone-preserved glands from the same species or mammalian preparations. The latter gave negative or questionably positive results. Half of the fish treated with carp glands responded positively, one negatively, and the rest questionably.

Steffens, W. (1957) 305
Dtsch.Fisch.-Ztg, 4(9):265-72
Gewinnung und Injektion von Karpfen-hypophysen (Obtaining and injecting carp pituitaries)

Detailed description of procedure for removing pituitary from freshly killed Cyprinus carpio, preservation in acetone, and injection into males and females of the same species. The not entirely successful results are discussed.

Sterba, G. (1961) 306
Z.Zellforsch., 55(6):763-89
Fluoreszenmikroskopische Untersuchungen über die Neurosekretion beim Bauchneunauge (Lampetra planeri Bloch) (Fluroscent microscopical investigations on the neurosecretion of the brook lamprey (Lampetra planeri Bloch))

Cytology of neurons and pathway of neurosecretion revealed by this technique.

Stewart, J. and C.H. Li (1962) 307
Science, 137(3527):336-7
On the use of -tropin or -trophin in connection with anterior pituitary hormones

Use of -tropin recommended. See Science 138(3541):723-30 for objections and comments by other authors, and a reply by Stewart and Li.

Stolk, A. (1957) 308
Aquarium, Rotterd., 28(3):56-9
De voortplanting van Acanthophthalmus kuhli (Valenciennes) (The propagation of Acanthophthalmus kuhli (Valenciennes))

Spawning apparently induced by adding PU to aquarium water. Changes in pituitary gland very briefly described.

Stolk, A. (1957) 309
Acta morph.neerl.-scand., 1(2):119-30
Histo-endocrinological analysis of gestation phenomena in the hemiramphid Dermogenys pusillus Van Hasselt. 2. Changes in the pituitary gland during pregnancy

Size changes correlated with corpus luteum cycle. Gonadotrophs not identified.

Stolk, A. (1958) 310
Acta morph.neerl.-scand., 1(3):209-23
Histo-endocrinological analysis of gestation phenomena in the hemiramphid Dermogenys pusillus Van Hasselt. 4. Corpus luteum cycle during pregnancy

Stages described resemble those found by author in the guppy, and author assigns "important task" to corpora lutea during gravidity, undoubtedly endocrinological.

Stolk, A. (1958) 311
Aquarium, Rotterd., 28(9):198-201
Merkwaardige goudvissenkweek
(Remarkable experiment with goldfish)

Carassius auratus spawned in goldfish bowl following addition of 0.5 ml of PU per 1 to water. Changes in pituitary very briefly described.

Stolk, A. (1958) 312
Aquarium, Rotterd., 28(11):247-9
Een klein kweeksucces met de kopstaander (A small success in breeding the headstander)

A spawning of Chilodus punctatus apparently induced by adding two doses of PU (0.5 ml per 1) to aquarium water.

Stolk, A. (1958) 313
Acta morph.neerl.-scand., 1(4):299-305
Changes in the embryonic pituitary gland in the hemiramphid Dermogenys pusillus Van Hasselt during the last part of the gestation period

Relative increase in size of parts of the pituitary is associated with increase in activity of thyroid, but neither thyrotrophs nor gonadotrophs are identified.

Stolk, A. (1959) 314
Aquarium, Rotterd., 29(10):230-3
Experimenten met grotbewonende vissen (Experiments with cave fishes)

Anoptichthys jordani spawned following the addition of 0.5 ml of PU to each litre of the aquarium water three times during a period of two months.

Stolk, A. (1959) 315
Aquarium, Rotterd., 30(3):66-8
Kweek van moeilijk kweekbare visjes en kruisingen met behulp van de methode Stolk (Breeding fishes that are difficult to breed and hybridization by means of Stolk's method)

Hyphessobrycon rosaceus and Sphaerichthys osphromenoides spawned after addition of PU to aquarium water. Two species of Aequidens hybridized after treatment, and hybrids between Poecilia (Lebistes) reticulata and P. (Mollienesia) sphenops were also obtained.

Stolk, A. (1959) 316
Bjdr.Dierk., 29:41-70
Activity of the thyroid and the pituitary gland in the viviparous cyprinodonts Lebistes reticulatus (Peters), Xiphophorus hellerii Heckel and Xiphophorus maculatus Günther during the development of the gonopodium

A gradual increase in activity of both glands accompanies the formation of the gonopodium from the anal fin of the male.

Stolk, A. (1959) 317
Acta morph.neerl.-scand., 2(3):255-75
Activity of the pituitary and the thyroid gland in the viviparous cyprinodont Xiphophorus hellerii Heckel during the development of the ventral part of the tail fin

Appearance and growth of the "sword", a male secondary sex character, is accompanied by an increase in activity of the pituitary and thyroid.

Stolk, A. (1960) 318
Proc.K.ned.Akad.Wet.(C), 63(4):518-47

Activity of the pituitary and the thyroid gland in the characid Corynopoma riisei Gill during the development of the spoon-shaped appendices of the opercula. 1 and 2

Both glands exhibit signs of increased activity, for example in golgi apparatus and chondriomes and in size and structure of the nucleus.

Stolk, A. (1962) 319
Aquarium, Rotterd., 32(7):165-8
Levenselixer (Elixir of life)

Review of author's previous reports on effect of PU on spawning of home aquarium fishes. Testis of treated Rasbora heteromorpha briefly described. Dosage discussed in detail.

Stoll, L.M. (1957) 320
Zoologica, N.Y., 42(3):99-104
Changes in the cytological structure of the adenohypophysis and gonads in juvenile Bathygobius soporator after pituitary implantation

Implantation of adult glands stimulated gonads and resulted in degranulation of peripheral cyanophils in pituitary. Latter effect attributed to inhibition of hormone production.

Strand, F.L. (1958) 321
N.Y. Fish Game J., 5(1):84-93
Effect of high carbohydrate diet and epinephrine in salmon and brook trout

Intramuscular injections of 100 micrograms of epinephrine every second day for nearly four weeks accelerated maturation in male and female Salvelinus fontinalis.

Sugiyama, K. (1959) 322
Gunma J.med.Sci., 7(4):257-64
Structural configurations of nerve fibers and neurosecretory activity as modified by some experimental procedures in the hypothalamic neurosecretory center

Surgical sections of brain of Parasilurus asotus just anterior to nucleus preopticus resulted in accumulation of neurosecretory material in cells and fibers of nucleus as well as in neurohypophysis. Gomori and Bodiam methods used to study this species, Anguilla japonica and seven others.

Sukhoverkhov, F.M. and A.S. Pisarenkova (1960) 323
Zool.Listy, 23(1):71-82
(The acclimation of Asiatic fishes in Europe) In Czech with German summary

Good growth shown by Ctenopharyngodon idellus and Hypophthalmichthys molitrix in Russian. Sexual maturation is delayed two years, requiring seven instead of five.

Sundararaj, B.I. (1958) 324
Copeia, 1958(4):289-97
The seminal vesicles and their seasonal changes in the Indian catfish, Heteropneustes

These specialized lobes of the testes secrete a fluid and show maximum size during the spawning season.

Sundararaj, B.I. (1959) 325
Acta anat., 37(1/2):47-80
A study on the correlation between the structure of the pituitary gland of the Indian catfish Heteropneustes and the seasonal changes in the ovary

The gonadotrophs are PAS-positive cyanophils (basophils) of which few appear to secrete LH. Marked seasonal changes occur only in gonadotrophs.

Sundararaj, B.I. (1960) 326
Acta anat., 40(4):305-22
Correlation between the structure of the pituitary and the changes in the testes of the Indian catfish Heteropneustes

Seasonal changes in male pituitary closely resemble those in female. Sperm present throughout year, but testes show seasonal changes.

Suzuki, R. (1957) 327
Bull.Aichi Gakugei Univ.(Nat.Sci.), 6:31-5
Studies on the artificial ovulation in cyprinid fishes. 1. Artificial ovulation in the minnow, river-chub, goldfish and crucian carp

Female Gnathopogon elongatus, Zacco temminckii, Carassius auratus and C. carassius responded more frequently, strongly and uniformly to intraperitoneal injections of acetone-dried pituitaries of Misgurnus anguillicaudatus and Cobitis taenia than those of cattle, dog or frog.

Suzuki, R. and H. Kobayasi (1958) 328
Bull.Aichi Gakugei Univ.(Nat.Sci.), 7:52-7
Studies on the artificial ovulation in cyprinid fishes. 2. Artificial ovulation in the stone minnow, scythe fish, carp and bitterlings

Female Pseudorasbora parva, Pseudogobio esocinus, Cyprinus carpio, Acheilognathus lanceolata and Rhodeus ocellatus responded positively to pituitaries of loaches (Family Cobitidae). Frog pituitaries were as effective only in Acheilognathus and Rhodeus.

Swarup, H. (1958) 329
Proc.zool.Soc.Bengal, 11(1):47-61
The reproductive cycle and development of the gonads in Gasterosteus aculeatus (L.)

Testes become mature at any time, but function only in the spawning season. Ovaries become mature only in the spawning season.

Swift, D.R. (1960) 330
Symp.zool.Soc.Lond., 2:17-27
Cyclical activity of the thyroid gland of fish in relation to environmental changes

Two types of cyclical activity exist, one of which is connected with the maturation of the gonad and results in an increased activity of the thyroid at spawning time.

Szabo, S. (1960) 331
Stud.Cercet.Biol.(anim.), 11(2): 105-18
(The histologic modification of the pituitary in the sexual cycle of the chondrostome Chondrostoma nasus (L.)) With French summary

Seasonal study of C. nasus and Barbus barbus. Gonadotrophic activity in former believed to be much greater than in latter.

Tampi, P.R.S. (1957) 332
Proc.Indian Acad.Sci.(B), 46(4): 254-73
Some observations on the reproduction of the milkfish Chanos chanos (Forskål)

Maturation stages described and breeding requirements and behavior discussed. A single spawning season is indicated.

Tang, Y.A. (1960) 333
Jap.J.Ichthyol., 8(1/2):1-2
Reproduction of the Chinese carps, Ctenopharyngodon idellus and Hypophthalmichthys molitrix, in a reservoir in Taiwan

Said to be the first time these species have spawned in such a confined area.

Tromp-Blom, N. (1959) 334
Proc.K.ned.Akad.Wet.(C), 62(3):225-37
The ovaries of Gasterosteus aculeatus (L.) (Teleostei) before, during and after the reproductive period

Seasonal and ontogenetic study. Functional corpora lutea not present.

Verigin, B.V. (1961) 335
Vop.Ikhtiol., 1(4):640-9
(Results of work in the sphere of acclimatization of Far-East herbivorous fishes and measures aimed at their study in new areas)
In Russian

Including Ctenopharyngodon idellus and Hypophthalmichthys molitrix. According to the author, progeny may be obtained by means of pituitary injections.

Vlatković, B. (1960) 336
Acta anat., 42(3):274-5
Der Sekretionszustand der Hypophyse des Zanders (Lucio perca Sandra) /sic/ im Verlaufe des Sexualzyklus (Conditions of secretion in the hypophysis of the pikeperch (Lucioperca lucioperca) during the sexual cycle)

Seasonal changes in cells of the pituitary are described, especially in the "basophils".

Votinov, N.P. and V.S. Iukhneva (1961) 337
Ryb.Khoz., (3):39-41
(Sexual maturation of the Siberian sturgeon when spawning migration is interrupted) In Russian

Acipenser baeri migrating upstream were caught in the autumn, overwintered in small lakes, and injected with pituitary substance the following spring. Ripe eggs were obtained and young hatched from them.

Wai, E.H. and W.S. Hoar (1963) 338
Canad.J.Zool., 41(4):611-28
The secondary sex characters and reproductive behavior of gonadectomized sticklebacks treated with methyl testosterone

Sixteen hours of light induced aggressive and territorial behavior in both male and female gonadectomized Gasterosteus aculeatus, and methyl testosterone did not augment this effect. Long photoperiods with testosterone treatment induced nest-building in about half of the castrated males, but only 6% of the females. Role of gonadotrophins and sex steroids in reproductive behavior is discussed.

Wingstrand, K.G. (1956) 339
Vidensk.Medd.dansk Naturh.Foren.Khb, (118):193-210

The structure of the pituitary in the African lungfish, Protopterus annectens (Owen)

Adenohypophysis differentiated into a pars distalis and a pars intermedia; if a pars tuberalis is present, it is poorly developed. Neurohypophysis and associated parts of brain also described, including the preoptic nucleus. Azan- and AF-positive cyanophils seen in pars distalis. The pituitary gland of the lungfishes resembles that of salamanders and differs from other bony fishes.

Wingstrand, K.G. (1959) 340
In Comparative endocrinology, edited by A. Gorbman. New York, John Wiley & Sons: pp.393-403
Attempts at a comparison between the neurohypophysial region in fishes and tetrapods, with particular regard to amphibians

Problem of homologies between parts of the fish and tetrapod pituitary is analyzed. The median eminence and neural lobe of tetrapods developed out of the neurohypophysis of fishes.

Woodhead, A.D. (1960) 341
Proc.Nutr.Soc., 19(1):23-8
Nutrition and reproductive capacity in fish

A review. Composition of fish gonads, relation of reproduction to growth, effects of dietary deficiencies, and embryo nutrition in viviparous fishes discussed.

Woodhead, A.D. (1961) 342
J.Endocrin., 22(4):421-32
Assays for gonadotrophins in the pituitary gland of the arctic cod, Gadus morhua L., and the presence of a gonadotrophic antagonist

Injections of cod pituitary increased ovarian weight in Scardinius erythrophthalmus and caused sperm release in Rana temporaria, but were ineffective on immature female rats or mature female rabbits. When injected with HCG or PMS into female

rats, cod pituitary prevented their response to the mammalian gonadotrophin

Wright, P.A. (1960) 343
Biol.Bull., Woods Hole, 119(2):351
Experiments with ovulation induced in vitro by means of steroids in frogs and marine fishes

Attempts to induce ovulation in excised ovaries of Fundulus heteroclitus, Tautoga onitis and Lophius americanus with pituitary extracts or steroids were unsuccessful.

Yamamoto, K. (1962) 344
Annot.zool.jap., 35(3):156-61
Origin of the yearly crop of eggs in the medaka, Oryzias latipes

New oocytes are produced each year through the multiplication of germinal cells.

Yamamoto, K. and K. Shirai (1962) 345
Annot.zool.jap., 35(4):218-22
Origin of the yearly crop of eggs in the bitterling, Rhodeus ocellatus

In contrast to the medaka, new oocytes are produced each year through the multiplication of residual oogonia.

Yamamoto, K. and F. Yamazaki (1961) 346
Bull.Fac.Fish.Hokkaido, 12(2):93-110
Rhythm of development in the oocyte of the gold-fish, Carassius auratus

Seasonal and ontogenetic changes in ovary and oocytes described. Oocytes occur at all stages in the mature gonad.

Yamamoto, T. (1962) 347
Gen.comp.Endocrinol., Suppl.1:341-5
Hormonic factors affecting gonadal sex differentiation in fish

Existence of gene-controlled sex-inductors postulated on basis of successful experiments in which functional sex-reversal was obtained by administering sex steroids to young Oryzias.

Yamazaki, F. (1961) 348
Bull.Fac.Fish.Hokkaido, 12(3):167-80
The effects of hypophysectomy on the ovary of the goldfish, Carassius auratus

Yolky eggs become atretic, like those in spent ovaries, and young eggs fail to acquire yolk. Effects on ovary varied with the season. Mock-operated controls used.

Yamazaki, F. (1962) 349
Bull.Fac.Fish.Hokkaido, 13(2):39-46
Effects of hypophysectomy on the ovulation, oviposition and sexual behavior in the goldfish, Carassius auratus

Ovulation inhibited but not oviposition. Males showed normal sex behavior, but sperm emission ceased about five days after the operation. Recently hypophysectomized males spawned with recently hypophysectomized females, producing normal offspring.

Yoshioka, H. (1962) 350
Bull.Fac.Fish.Hokkaido, 13(3):123-36
On the effects of environmental factors upon the reproduction of fishes. 1. The effects of day-length on the reproduction of the Japanese killifish, Oryzias latipes

Short days ended egg-laying, while long ones advanced the reproductive season in males and females. Eggs laid by females exposed to 18 hours of light were smaller than normal.

Zaitsev, A.V. (1959) 351
Dokl.Akad.Nauk SSSR, 127(2):465-8
(Effect of hypophysial injections on the hypophysis in the female sturgeon (Acipenser güldenstädti persicus Borodin)) In Russian

The injections into Acipenser güldenstädti did not stimulate the pituitary, and ovulation is therefore the result of the introduced hormone.

Zaitsev, A.V. (1959) 351
Dokl.Akad.Nauk SSSR (En Transl.biol. Sci.Sec.), 127(1/6):626-9

Effect of hypophysial injections on the hypophysis in the female sturgeon (Acipenser güldenstädti persicus Borodin) In English

Zaitsev, A.V. (1961) 352
Dokl.Akad.Nauk SSSR, 140(4):952-5
(Structure and state of the thyroid gland of Acipenser güldenstädti persicus Borodin before, during and after spawning) In Russian

The thyroid exhibits signs of heightened activity in female Acipenser güldenstädti persicus

Zaitsev, A.V. (1961) 352
Dokl.Akad.Nauk SSSR (En Transl.biol. Sci.Sec.), 140(1/6):833-6
Structure and state of the thyroid gland of Acipenser güldenstädti persicus Borodin before, during and after spawning In English

ADDENDUM

Ahsan, S.N. and W.S. Hoar (1963) 353
Canad.J.Zool., 41(6):1045-53
Some effects of gonadotropic hormones on the threespine stickleback, Gasterosteus aculeatus

Mammalian FSH ineffective. Mammalian LH, HCG, PMS, and TSH effective, but effectiveness of TSH attributed to contamination with gonadotrophin. Crude extracts of alcohol-preserved pituitaries from Oncorhynchus only partially effective.

Alikunhi, K.H., K.K. Sukumaran and S. Parameswaran (1963) 354
Curr.Sci., 32(3):103-6
Induced spawning of the Chinese carps Ctenopharyngodon idellus (C. & V.) and Hypophthalmichthys molitrix (C. & V.) in ponds at Cuttack, India

Male and female Ctenopharyngodon idellus and Aristichthys nobilis yielded ripe sex products after 1-3 intramuscular injections of absolute alcohol-preserved pituitaries from Labeo rohita, the maximum total dose being 6 mg per kg of weight. Hypophthalmichthys molitrix successfully treated with glands from its own species. Young raised, but hybrid young died at early stages. Environmental conditions, especially temperature, described.

Ball, J.N., M. Olivereau and K.D. Kallman (1963) 355
Nature, Lond., 199(4893):618-20
Secretion of thyrotrophic hormone by pituitary transplants in a teleost fish

Technique of transplantation that avoids homograft reaction described. Mollienesia formosa used. Inactive gonadotrophs were present in the grafts.

Braekkan, O.R. and G. Boge (1962) 356
Fiskeridir.Skr.teknol.Undersøk., 4(2):15 p.
Further studies on vitamins and the reproductive cycle of ovaries in cod (Gadus morhua)

Vitamins B_6, B_{12} and biotin studied and their possible specific importance in fish reproduction is indicated.

Clemens, H.P. and S.B. Grant (1964) 357
Zoologica, N.Y., 49:in press
Gonadal hydration of carp, Cyprinus carpio, and goldfish, Carassius auratus, after injections of pituitary extracts

Pituitary hormone of carp induces seminal plasma elaboration in male fish and ovulation in female. A bioassay technique based on the male reaction is described. Effects of light, handling and other environmental and hormonal factors are discussed.

Dodd, J.M. and T. Kerr (1963) 358
Symp.zool.Soc.Lond., 9:5-27

Comparative morphology and histology of the hypothalamo-neurohypophysial system

In cyclostomes, elasmobranchs, and bony fishes including lungfishes. Morphology of the pituitary and its nervous and circulatory connections with the brain discussed in the light of evolutionary relationships.

Fontaine, M. and M. Olivereau (1962) 359
Ann.Nutr., Paris, 16(6):A125-52
Nutrition et sexualité chez les poissons

Relationship of nutrition and sexual maturation reviewed and discussed, with extensive bibliography.

Henderson, N.E. (1963) 360
J.Fish.Res.Bd Can., 20(4):859-97
Influence of light and temperature on the reproductive cycle of the eastern brook trout, Salvelinus fontinalis (Mitchill)

Accelerated light regime hastened maturation of adult males and females, but had no effect on fish maturing for the first time. Fish exposed to short or long day-lengths responded differentially to high or low temperatures, but those in natural day-length did not.

Henderson, N.E. (1963) 361
J.Fish.Res.Bd Can., 20(4):899-908
Extent of atresia in maturing ovaries of the eastern brook trout, Salvelinus fontinalis (Mitchill)

No major reduction in number of developing ova occurs during the secondary growth phase.

Hisaoka, K.K. and C.F. Firlit (1962) 362
Copeia, 1962(4):788-92
Ovarian cycle and egg production in the zebrafish, Brachydanio rerio

At 26°C, females exhibit a precise ovarian cycle of mating and egg-laying every five days. Higher temperatures reduce the interval, lower ones inhibit ovulation. Spawning occurs soon after daybreak.

Honma, Y. (1958) 363
Bull.Jap.Soc.sci.Fish., 24(2):87-92
On two new specimens of catadromous eels from Sea of Japan, with special reference to its pituitary gland

One male and female described but not identified. Undoubtedly Anguilla japonica.

Irikhimovich, A.I. and A.M. Zelenin (1961) 364
In Questions of hydrobiology and ichthyology of Moldavian bodies of water, Kishinev, Shtiintsa, pp.59-63
(Accelerated development of gonadotrophic functions of the pituitary and early sexual maturity correlated with an accelerated growth rate) In Russian

Comparison of carp reared in populations of high and low density. The latter favored more rapid growth, and in these fish, pituitary basophils, correlated with full development of the thyroid gland, appeared earlier. Males matured before females.

John, K.R. (1963) 365
Copeia, 1963(2):286-91
The effect of torrential rains on the reproductive cycle of Rhinichthys osculus in the Chiricahua mountains, Arizona

Role of light, temperature and flooding analyzed in the regulation of the bimodal spawning season.

Kazanskii, B.N. (1962) 366
Uchen.Zap.leningr.Univ.(biol.), (311):19-45
(Experimental analysis of the seasonal nature of reproduction in Volga acipenserids as related to the phenomenon of intraspecific biological differentiation) In Russian with English summary

Series of small doses of pituitary material, followed by single, larger dose used to induce spawning in hiemal races of Acipenser.

Korbayashi, H., S. Ishii and A. Gorbman (1959) 367
Gunma J.med.Sci., 8(3):301-21
The hypothalamic neurosecretory apparatus and the pituitary gland of a teleost, Lepidogobius lepidus

Gland is located in hollowed-out space within brain. No gonadotrophs identified. Transection of neurosecretory tracts resulted promptly in accumulation of aldehyde-fuchsin staining material at proximal ends of cut axones.

Nair, P.V. (1963) 368
Proc.zool.Soc.Bengal, 16(1):51-65
Ovular atresia and the formation of the so-called "corpus luteum" in the ovary of the Indian catfish, Heteropneustes fossilis (Bloch)

No evidence found for functional corpus luteum.

Sathyanesan, A.G. and T.P. Singh (1963) 369
J.zool.Soc.India, 14(1/2):165-9
Some observations on the seasonal changes in the "periodic acid-Schiff" positive cells in the pituitary of the catfish Mystus vittatus (Bloch)

Gradual increase occurs before spawning season and drastic decrease afterward. Acidophils are believed to change into cyanophils during this cycle.

Schreibman, M.P. (1963) 370
Dissert.Abstr., 24(2):905
Studies on the pituitary gland of Xiphophorus maculatus (the platyfish)

Study of young and old specimens, gravid females and castrated males revealed changes in cyanophils that identify them as gonadotrophs.

Stolk, A. (1963) 371
Aquarist & Pondkpr, 27(10):189-90
The reproduction of the kuhli fish (Acanthophthalmus kuhli)

Half a ml of PU per 1 added to aquarium water, and reproduction after several weeks. Changes in pituitary gland briefly described. (See 308).

Tang, Y.A. (1960) 372
Chin.Fish.Mon., 96(1):1-11
(Report of the investigation on spawning of Chinese carps in Ah Kung Tian Reservoir) In Chinese with English summary

See reference No. 333.

Uchida, R.N. and J.E. King (1962) 373
Fish.Bull., U.S., 62(199):21-52
Tank culture of tilapia

Effects of temperature and salinity on reproduction of Tilapia mossambica are described.

Yashouv, A. (1958) 374
Bamidgeh, 10(4):75-80
Acclimatization of new species in the fishponds of the station. In English and Hebrew

Ctenopharyngodon idellus matured in ponds in Israel, but treatment with carp pituitary and mammalian hormones did not induce spawning.

Arnoult, J. (1961) 375
Bull.Mus.Hist.nat., Paris, 2 sér., 33(4):391-5
Premières observations en captivité sur un poisson de la famille des Polypteridae: Polypterus senegalus senegalus (Cuvier). Comportement sexuel et ponte provoquée (First observations in captivity of a fish of the family Polypteridae: Polypterus senegalus senegalus (Cuvier). Sexual behavior and induced oviposition)

Intramuscular injection of 500 I.U. of CG into male and female was followed, three weeks later, by laying of eggs, which did not develop. Injection of another pair unsuccessful.

Tang, Y.A., Y.W. Hwang and C.K. Liu (1963) 376
Occ.Pap.Indo-Pacif.Fish.Coun., 63/14:7 p.

Preliminary report of injection of pituitary hormone to induce spawning of Chinese carps

Successful induction is reported for Ctenopharyngodon idellus, Aristichthys nobilis and Hypophtalmichthys molitrix in 1963 spawning season in Taiwan.

Clemens, H.P. and F.B. Grant (1964) 377
Zoologica, N.Y., 49
Gonadal hydration of carp (Cyprinus carpio) and goldfish (Carassius auratus) after injections of pituitary extracts

Response of testes, 24 hours after injection of carp pituitary extract, provides an ideal biological assay of gonadotrophin.

Liu, Chia-kang (1963) 378
Chung-kuo Shue-tsang, 129:2-4
(Experiment on the artificial propagation of the grass carp, Ctenopharyngodon idellus, cultured in ponds) In Chinese

Female and male Ctenopharyngodon idellus, which were raised in ponds in Taiwan, matured there and when injected with pituitaries of Cyprinus carpio, Hypophthalmichthys molitrix and Aristichthys nobilis, ovulation was induced, the eggs artificially fertilized, and hatching occurred. It usually required two injections, six hours apart, totalling from one to one and a half Cyprinus glands for females and one half to one for males.

Tang, Yun-An (1963) 379
Jap.J.Ichthyol., 10(2/6):24-7
The testicular development of the silver carp, Hypophthalmichthys molitrix (C. & V.), in captivity in relation to the repressive effects of wastes from fishes

Pituitary treatment was unsuccessful. Fully mature male silver carp occurred only in a reservoir following a three to five fold increase in volume as a result of rain.

Experiments with Cyprinus carpio showed that water in which fish had lived for two days did not stimulate spawning, while fresh water did.

Tang, Y.A., C.K. Liu and I.W. Hwang 380
(1963)
Chung-kuo Shue-tsang, 129:5-9
(Preliminary report on the propagation of the Chinese carps by means of injecting pituitary hormone to induce ovulation) In Chinese

A further account of the work reported by C. Liu (1963).

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